

# LOS Vacuum Products

ANCORP is partnered with LOS Low Outgassing Solutions as the exclusive seller and distributor of bimetals, aluminum, and titanium flanges and fittings for UHV and XHV systems.



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## Overview

LOS Vacuum Products provide vacuum technology innovators with the lowest outgassing solutions ideal for an array of applications including spectroscopy, atomic physics research, particle acceleration, and microscopy.

LOS vacuum components and vacuum flanges are an alternative to the standard. Superior titanium, stainless steel, and aluminum alloys allow for quick evacuation of vacuum chambers. Advanced LOS technology makes it easy for end-users to obtain ultra-high vacuum (UHV) and extreme high vacuum (XHV) ratings. All LOS flanges are cleaned in an ultrasonic tank and packaged with dry nitrogen for cleanliness.

### Product Overview:

- Bimetal CF Flanges
  - 304SS/Al Bonded Bimetal CF Flanges
  - 316SS/Al Bonded Bimetal CF Flanges
  - Ti/Al Bonded Bimetal CF Flanges
- Titanium CF Flanges
- Bimetal Face Seal Fittings, VCR®-Style
  - 304SS/Al Bimetal Face Seal Fittings
  - 316SS/Al Bimetal Face Seal Fittings
  - Ti/Al Bimetal Face Seal Fittings
- ISO-QF Quick Release Aluminum Fittings
- Aluminum & Titanium Chambers and Customs



## Benefits of Titanium and Aluminum

### Aluminum

- Fast uniform bakeouts
- Lower bakeout temperature at 150° C
- Increased thermal diffusivity
- Lower outgassing rate than stainless steel
- Better vibration damping than stainless steel

### Titanium

- Low Z attribute
- Negligible magnetic permeability
- 25% higher yield strength than 6061-T6 Al
- Lower outgassing rate than stainless steel
- Better vibration damping than stainless steel

	Titanium (JIS - 2)	Stainless Steel (SUS304)	Aluminum Alloy (A5052)
<b>Atomic Number</b>	22	FE:26, Cr:24, Ni:28	13
<b>Specific Gravity (10<sup>3</sup> kg·m<sup>-3</sup>)</b>	4.5	7.9	2.7
<b>Hardness (Hv)</b>	~150	~190	~60
<b>Young's Modulus (G Pa)</b>	106	200	69
<b>Thermal Expansion Coefficient (10<sup>-6</sup>K<sup>-1</sup>)</b>	8.4	17	24
<b>Thermal Conductivity (W·m<sup>-1</sup>·K<sup>-1</sup>)</b>	17	16	137
<b>Specific Heat (J·kg<sup>-1</sup>·K<sup>-1</sup>)</b>	520	500	900
<b>Electric Resistance (10<sup>-9</sup>Ωm)</b>	480	720	49
<b>Magnetism</b>	Non-magnetic	Little	Non-magnetic
<b>Cost (USD) (1m x 1m x 1mm)</b>	658	134	77

H Kurisu et al 2008 J. Phys.: Conf. Ser. 100 092002

## Aluminum and Titanium Chambers and Custom Fabrication

ANCORP's partnership with LOS Outgassing Solutions allows us to provide our customers with custom ultra-high and extreme high vacuum chambers with titanium and aluminum bodies. Aluminum and titanium offer UHV and XHV applications enhanced bakeout performance and lower outgassing rates compared to their stainless-steel counterparts.

Aluminum and Titanium also provide end-users higher vibrational damping than stainless steel due to the materials' Young's Modulus. This higher vibrational damping greatly benefits applications requiring precision in targeted instrumentation. Both titanium and aluminum chambers also have thermal conductivity coefficients several magnitudes greater than stainless steel enabling faster bakeout times. Additionally, these materials feature less hydrogen in the alloy structure contributing to decreased outgassing rates.



### Chamber Configurations

Configurations available for aluminum chambers include billet, plate weld, rollup, and spherical style. Titanium chambers are currently limited to billet style only at this time.

To request a quote for a custom product, visit [ancorp.com/request-a-quote/](https://www.ancorp.com/request-a-quote/) or contact a member of our technical sales team at **1-800-352-6431**. Quotations can be generated from simple, freehand sketches. Electronic files can be sent in a variety of file formats. When needed, ANCORP can supply a complete set of engineered drawings.

## Bimetal ConFlat Flanges

Bimetal ConFlat flanges offer users the unique ability to harness the properties of two different metal alloys in their UHV or XHV processes.

Three (3) different bimetal ConFlat flanges are available:

- 304SS-Al Bonded Bimetal CF Flanges
- 316SS-Al Bonded Bimetal CF Flanges
- Ti-Al Bonded Bimetal CF Flanges

LOS 304SS-Al, 316SS-Al, and Ti-Al bimetal CF flanges are available in industry-standard sizes (mini 1.33" to 12.0"), rotatable and fixed geometries, and various bolt hole types.



### Features

- UHV/XHV rated to  $1 \times 10^{-13}$  Torr
- Available sizes: 1.33" to 12"
- Rotatable and fixed geometries
- 40% lighter than traditional SS flanges
- Tapped or clearance bolt holes
- Conflat® compatible design
- Custom flanges also available

### Specifications

- Materials
  - Flange Body / Weld Interface: 6061 -T6 Aluminum
  - Flange Knife-edge: 304SS/316SS/Ti
  - Ti Flange Gaskets: 1100 or 1050 Aluminum
  - Recommended Bolts: 300 SS silver plated or Titanium
- Fastening
  - Bolt Type: Socket head screws
  - Nut Type: Hexagonal or two-hole plate nuts
- Temperature Range: -200°C to 150°C

Bimetal flange users can capitalize on an aluminum system connection while retaining industry-standard 304SS, 316SS, or Ti alloy benefits such as excellent knife-edge retention. Aluminum system connections provide increased vibration damping, decreased outgassing paths, and greater thermal conductivity and diffusivity.

## Titanium ConFlat Flanges

Titanium ConFlat (CF) flanges are lightweight, feature increased strength, and have negligible magnetism making them the perfect option for UHV and XHV magnetically sensitive applications including nuclear physics, UHV synchrotrons, and laser physics. Due to the material's specific heat capacity and paramagnetism, titanium flanges equipped to a titanium chamber offer end-users a virtually non-magnetic system with shorter bakeout times compared to the stainless-steel counterpart.



LOS titanium CF flanges are available in industry-standard sizes (mini 1.33" to 12.0"), rotatable and fixed geometries, and various bolt hole types.

### Features

- UHV/XHV rated to  $1 \times 10^{-13}$  Torr
- Available sizes: 1.33" to 12"
- Rotatable and fixed geometries
- Tapped or clearance bolt holes
- Conflat® compatible design
- Custom flanges also available

### Specifications

- Materials
  - Flange Body / Rotatable Housing: Grade 2 Titanium
  - Ti Flange Gaskets: 1100 or 1050 Aluminum
  - Recommended Bolts: 300 SS silver-plated or Titanium
- Fastening
  - Bolt Type: Socket head screws
  - Nut Type: Hexagonal or two-hole plate nuts
- Temperature Range: -200°C to 150°C

## Bimetal Face Gland Fittings

LOS bimetal face gland fittings offer high-quality seals for UHV systems. Face gland fittings connect system components through a pipe cross-section with one weldable end and the other a VCR®-style connection.

Three (3) different bimetal face gland pairings are available:

- 304SS/Al Bimetal Face Gland Fittings
- 316SS/Al Bimetal Face Gland Fittings
- Ti/Al Bimetal Face Gland Fittings

LOS bimetal face gland fittings are available in butt weld, socket weld, and male weld styles with sizes from 1/4" to 1".

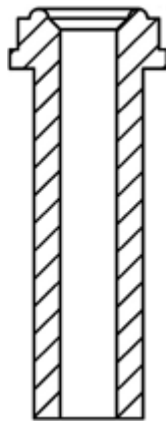


### Features

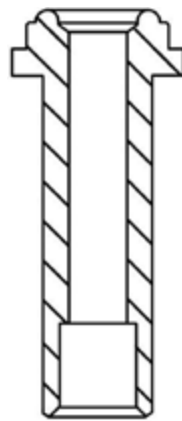
- UHV/XHV rated to  $1 \times 10^{-13}$  Torr
- Available in butt weld, socket weld, and male weld styles
- Sizes from 1/4" to 1"
- Compatible with VCR®-style hardware

### Specifications

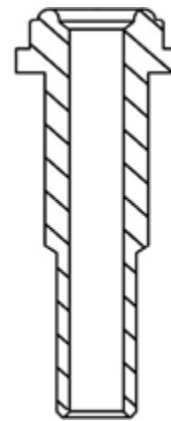
- Materials
  - Body / Weld Interface: 6061-T6 Aluminum
  - Sealing Surface: 316 Stainless Steel
- Fastening
  - Nut Type: VCR®-style male/female
- Temperature Range: -200°C to 150°C



Butt Weld



Socket Weld



Male Weld



## ISO Quick Release Aluminum Weld Fittings

ISO quick release aluminum fittings can be welded to aluminum chambers to create high vacuum (HV) elastomer-sealed ISO-QF (also known as KF or NW) ports.

Available in weld neck or chamber weld types, aluminum quick release fittings allow aluminum chambers to maintain their low-magnetic interactions, fast bakeout time, and lightweight – an important consideration for applications where overall weight is a consideration, such as in the aerospace industry.

Chamber weld aluminum quick-release fittings feature different collar thickness options to better attach to varying plate thicknesses. Weld neck aluminum quick-release fittings have a consistent weld neck thickness for general use.

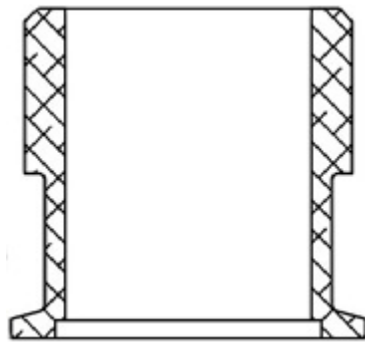


### Chamber Weld Features

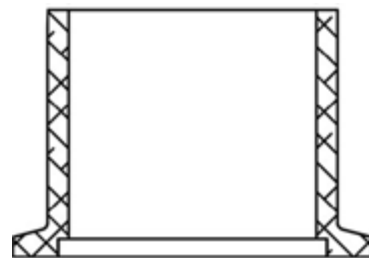
- Sizes available: QF10 to QF50
- Plate Thickness Options: 0.50", 0.75", 1.00"

### Weld Neck Features

- Sizes available: QF10 to QF50
- Consistent weld neck thickness



**Chamber Weld**



**Weld Neck**

To shop our full line of UHV and XHV products from LOS Low Outgassing Solutions, visit:

**[www.ancorp.com](http://www.ancorp.com)**



## Empowering Science and Technology Since 1965.

As manufacturers of high and ultra-high vacuum components, we serve researchers, scientists, engineers, and manufacturers with the products they need to build and maintain their vacuum systems. We offer everything from vacuum hardware and valves to chambers and custom fabrications.



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