

# INTRODUCTION

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**Thomas Dobler**  
VP of Sales

**Chris Long**  
CFO

**Ken Harrison**  
President & CEO

GNB KL Group is a company of technical experts serving other technology experts. Since our beginning in 1968, it has been our commitment to technology that has set us apart. During this time we have produced outstanding, innovative products that have met the most demanding applications in areas such as temperature extremes, large sizes, radiation levels, vacuum levels, vibration levels, and other unique applications.












GNB KL Group is about more than just technology, we are passionate about building winning relationships. It is our corporate vision that customers will be so impressed that they say, "Wow! We want to do business with GNB again."

We have deigned this catalog as an overview of all product lines offered at GNB KL Group. Please contact us directly for your specific company needs.





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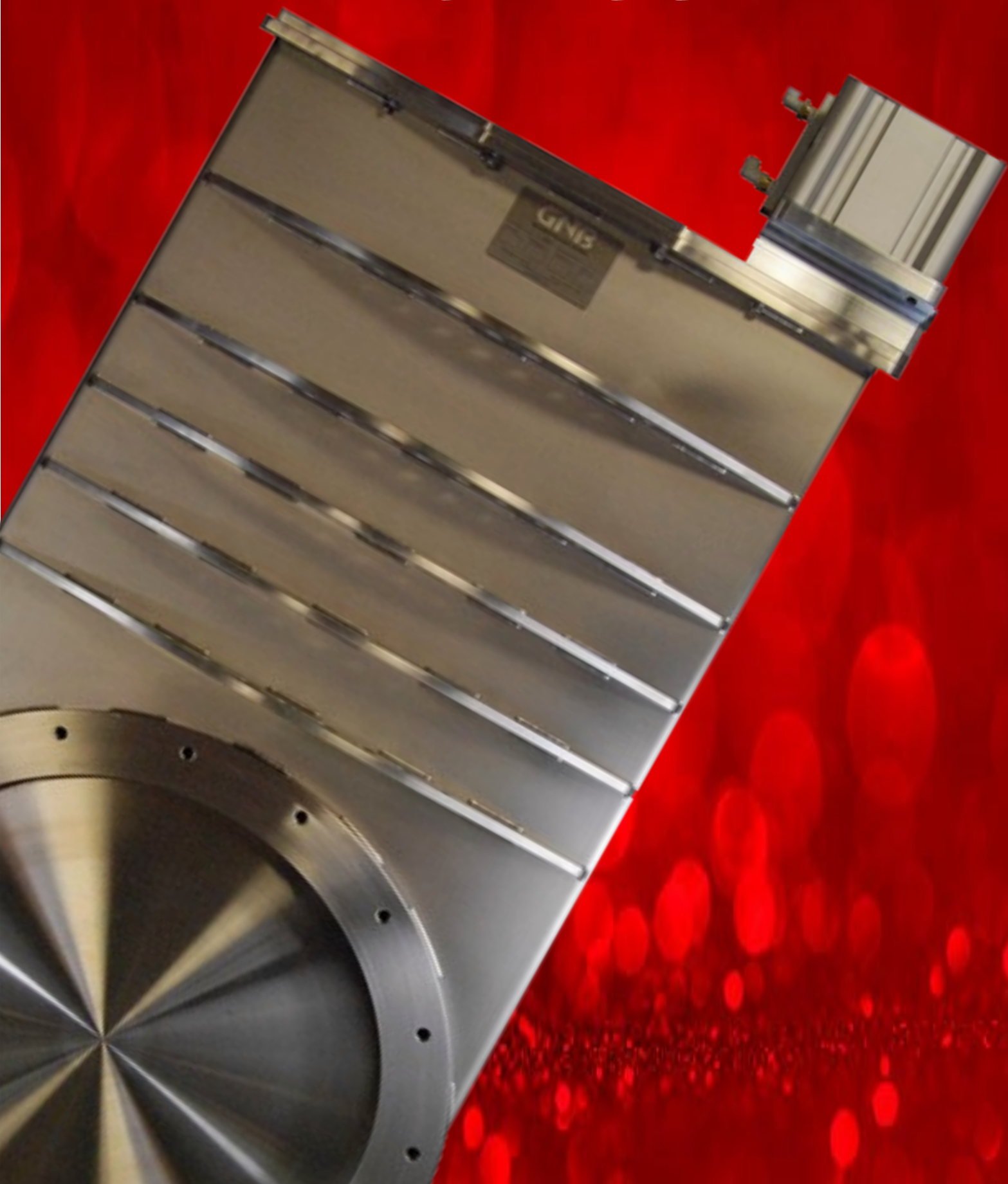
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# Valves



# ANGLE VALVES SMALL



Right Angle



In-Line



Z-Type In-Line

## MAIN APPLICATIONS

- Pumping and Venting of HV and UHV systems

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-K (KF16-KF50)
  - ISO-F (63-250)
  - CF (OD1.33"-8" / ID 3/4"-6" (16-160mm))
  - Tube Ends for Weld Connections
- Bonnet Seal
  - FKM
  - OFHC Metal Gasket (UHV Version)
- Actuator:
  - Manual / Hand Wheel
  - Pneumatic (Position Indicators and Solenoid optional)
  - Spring Closed up to KF50

## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-8}$  mbar to 2bar (abs) (FKM)
  - $5 \times 10^{-10}$  mbar to 2bar (abs) (UHV Version)
- Leak Rate:
  - Valve Body:
    - HV Version  $< 1 \times 10^{-9}$  mbar  $\text{Is}^{-1}$
    - UHV Version  $< 1 \times 10^{-10}$  mbar  $\text{Is}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{Is}^{-1}$
- Cycle Life:
  - $> 1,000,000$
- Max Temperature:
  - 200C / 392F
- Material
  - Body: 304L
  - Actuator: 6061 Aluminum
  - Feedthrough: Bellows AM350

# ANGLE VALVES LARGE

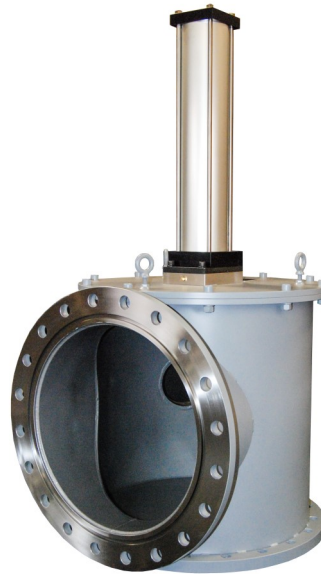


## MAIN APPLICATIONS

- Diffusion Pump Isolation.  
Can be combined with GNB Baffles to reduce Backstreaming

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-K or ISO-F 320 to 1000
  - ASA 12" to 40" ID
  - Custom Flanges
- Bonnet Seal
  - FKM (Stainless Versions)
  - Buna (Mild Steel Versions)
- Actuator:
  - Pneumatic (Position Indicators and Solenoid Included)
  - Hydraulic
- Feedthrough:
  - Dual O-Ring Shaft Feedthrough
  - Hydroformed Bellows Feedthrough
  - Welded AM350 Bellows
- Common Options:
  - Ports on Body, Water cooling, and more



## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-6}$  mbar to 1.2bar(abs)Mild Steel
  - $10^{-8}$  mbar to 1.2bar(abs)Stainless
  - $10^{-9}$  mbar to 1.2bar(abs)w Bellows
- Leak Rate:
  - Valve Body:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life:
  - > 100,000 with Shaft Feedthrough
  - > 1,000,000 with Bellows
- Max Temperature:  
200C / 392F
- Material
  - Stainless Steel 304 or 316
  - Painted Mild Steel A36

# BALL VALVES



## MAIN APPLICATIONS

- General Purpose Valves  
Ball Valves work in very harsh vacuum applications and are often used in exhaust lines of Semiconductor tools

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-K (KF16-KF50)
  - Tube Ends 3/4" - 2"
- Feedthrough:
  - FKM
- Gate Seal:
  - PTFE
- Actuator:
  - Manual / Hand Lever
  - Pneumatic
  - Solenoid optional
  - Visual Position Indicator Included



## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-5}$  mbar to 6bar (abs)
- Leak Rate:
  - Valve Body:  $< 1 \times 10^{-8}$  mbar  $\text{ls}^{-1}$
- Cycle Life:
  - $> 30,000$
- Max Temperature:
  - 200C / 392F
- Material:
  - Body and Ball 316L Stainless
  - Pneumatic Actuator: Aluminum
  - Manual Actuator: 304L w. cover

# KOMPACT GATE VALVES



Manual



Pneumatic

## MAIN APPLICATIONS

- General Purpose small UHV gate valve

## AVAILABLE VERSIONS

- Flange Types:
  - CF2.75" (40mm ID)
- Bonnet Seal
  - OFHC Metal Gasket
- Gate Seal
  - Vulcanized FKM Seal
- Actuator:
  - Manual / Hand Wheel
  - Pneumatic (Position Indicators and Solenoid Included)
  - SMART Lock System to keep valve closed without compressed air pressure

## PRODUCT SPECIFICATION

- Pressure Range:
  - $1 \times 10^{-10}$  mbar to 2bar (abs)
- Leak Rate:
  - Valve Body:  $< 5 \times 10^{-10}$  mbar  $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life:
  - >100,000
- Max Temperature:
  - 200C / 392F
- Material
  - Body: 304L
  - Gate: 304L
  - Feedthrough: Bellows AM350

# ALUMINUM GATE VALVES



## MAIN APPLICATIONS

- General Purpose low cost aluminum Gate Valve

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-F 100 to 250
- Bonnet Seal
  - FKM O-Ring
- Gate Seal
  - FKM O-Ring
- Feedthrough
  - Dual FKM O-Ring
- Actuator:
  - Pneumatic (Position Indicators and Solenoid included)
  - Roller Lock System to keep valve

## PRODUCT SPECIFICATION

- Pressure Range:
  - $1 \times 10^{-7}$  mbar to 1.6bar (abs)
  - $1 \times 10^{-7}$  mbar to 1.2bar(abs) DN250
- Leak Rate:
  - Valve Body:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life:
  - DN100:  $> 200,000$
  - DN160 to DN250  $> 100,000$
- Max Temperature:
  - 120C / 248F
- Material
  - Body: 6061 Aluminum
  - Mechanism: 6061 Aluminum

# SMART GATE VALVES



## MAIN APPLICATIONS

- General Purpose HV and UHV Stainless Gate Valves

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-F (63 - 200)
  - CF OD 4.5"-10" / ID 2.5"-8" (63-200mm)
  - ASA and other Flange Types on Request
- Bonnet Seal
  - FKM (SMART Valve and HV In-Axis)
  - OFHC Metal Gasket (UHV In-Axis)
- Feedthrough
  - SMART: Rotary Type FKM
  - In-Axis HV: Welded Bellows AM350
  - in Axis UHV: Welded Bellows AM350
- Actuator:
  - Manual / Hand Lever
  - Pneumatic (Position Indicators and Solenoid Included)



## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-8}$  mbar - 1.2bar (abs) SMART
  - $10^{-8}$  mbar - 1.2bar(abs) In-Axis HV
  - $10^{-10}$  mbar - 1.2bar(abs) UHV
- Leak Rate:
  - Valve Body:

SMART	$< 1 \times 10^{-9}$ mbar $\text{ls}^{-1}$
In-Axis HV	$< 1 \times 10^{-9}$ mbar $\text{ls}^{-1}$
In-Axis UHV	$< 1 \times 10^{-10}$ mbar $\text{ls}^{-1}$
UHV Version	$< 1 \times 10^{-10}$ mbar $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life:

SMART	>200,000
In-Axis HV	>200,000
In-Axis UHV	>50,000
- Max Temperature:  
200C / 392F
- Material
  - Body: 304L
  - Actuator: 6061 Aluminum

# SPACE SAVER GATE VALVES



## MAIN APPLICATIONS

- General Purpose HV and UHV Stainless Gate Valves. Ideal for Pump Isolation

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-F (250 to 500)
  - ASA 10" to 20" (ID)
  - Custom and other Flange Types
- Bonnet Seal
  - FKM Standard
  - OFHC Metal Gasket Optional
- Feedthrough
  - Welded Bellows AM350 rated for >1,000,000 cycles
- Actuator:
  - Pneumatic (Position Indicators and Solenoid Included)

## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-8}$  mbar - 1.2bar (abs)
- Leak Rate:
  - Valve Body:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
  - with OFHC Seal  $< 1 \times 10^{-10}$  mbar  $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life: >200,000
- Max Temperature: 200C / 392F
- Material
  - Body: 304L
  - Actuator: 6061 Aluminum
  - Feedthrough: Bellows AM350

# DIRECT LINEAR GATE VALVES



## MAIN APPLICATIONS

- Large Cryo-Pump Isolation.  
Standard Valve for Space Simulation  
Valves worldwide

## AVAILABLE VERSIONS

- Flange Types:
  - ISO-F 250 to 4000
  - ASA 10" to 160" ID
  - Custom Flanges
- Bonnet Seal
  - FKM (Stainless Versions)
  - Buna (Mild Steel Version)
- Actuator:
  - Pneumatic (Position Indicators and Solenoid Included)
  - Hydraulic
  - Electric
- Feedthrough:
  - Dual O-Ring Shaft Feedthrough
  - Welded AM350 Bellows
- Common Options:
  - Ports on Body, Water cooling (Gate, Body),  
Lock our Tag Out (LOTO), and more

## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-6}$  mbar to 1.2bar(abs) Mild Steel
  - $10^{-8}$  mbar to 1.2bar(abs) Stainless
  - $10^{-9}$  mbar to 1.2bar(abs) w Bellows
- Leak Rate:
  - Valve Body:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life:
  - > 100,000 with Shaft Feedthrough
  - > 1,000,000 with Bellows
- Max Temperature:  
200C / 392F
- Material
  - Stainless Steel 304 or 316
  - Painted Mild Steel A36

# SEMICONDUCTOR SLIT VALVES



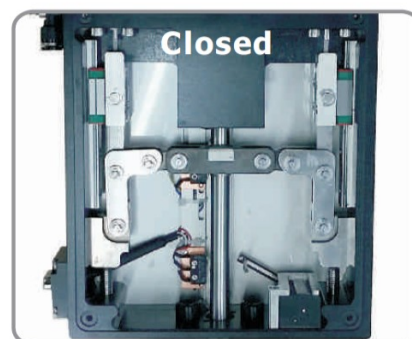
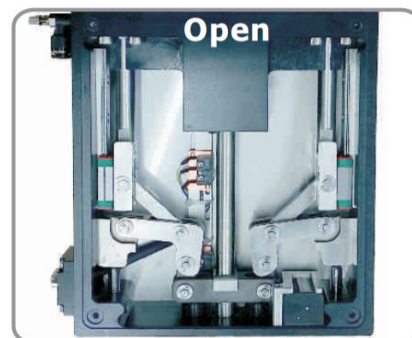
## MAIN APPLICATIONS

- Transfer Valve for the Semiconductor Industry

## AVAILABLE VERSIONS

- Available Sizes:
  - 32x222mm
  - 46x236mm
  - 50x336mm
  - 70x500mm
  - Other sizes on Request
- Bonnet Seal
  - FKM
  - OFHC Metal Gasket (UHV Version)
- Actuator:
  - Manual / Hand Wheel
  - Pneumatic with ARM Lock System (Position Indicators Included / Solenoid optional)

## ARM Lock System



## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-8}$  mbar to 1bar (abs) (HV)
  - $10^{-10}$  mbar to 1bar (abs) (UHV)
- Leak Rate:
  - Valve Body:
    - HV Version  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
    - UHV Version  $< 1 \times 10^{-10}$  mbar  $\text{ls}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{ls}^{-1}$
- Cycle Life: >5,000,000
- Max Temperature:
  - 200C / 392F (UHV)
  - 100C / 212F (HV)
- Material
  - Body: 304L or Aluminum
  - Actuator: 6061 Aluminum
  - Feedthrough: Bellows AM350

# SLIT VALVES



## MAIN APPLICATIONS

- For FPD, Glass Coaters and any other Applications that requires large Slit Valves

## AVAILABLE VERSIONS

- Flange Types:
  - Any up to 4000x4000mm (160x160")
- Bonnet Seal
  - FKM (Stainless Versions)
  - Buna (Mild Steel Version)
  - Metal (Optional, UHV Version)
- Actuator:
  - Pneumatic (Position Indicators and Solenoid Included)
  - Hydraulic
  - Electric
- Feedthrough:
  - Dual O-Ring Shaft Feedthrough
  - Welded AM350 Bellows
- Common Options:
  - Ports on Body, Water cooling (Gate, Body), Lock out Tag Out



## PRODUCT SPECIFICATION

- Pressure Range:
  - $10^{-6}$  mbar to 1.2bar(abs)Mild Steel
  - $10^{-8}$  mbar to 1.2bar(abs)Stainless
  - $10^{-9}$  mbar to 1.2bar(abs)w Bellows
  - $10^{-10}$  mbar to 1.2bar(abs)UHV
- Leak Rate:
  - Valve Body:  $< 1 \times 10^{-9}$  mbar  $\text{Is}^{-1}$
  - Valve Seat:  $< 1 \times 10^{-9}$  mbar  $\text{Is}^{-1}$
- Cycle Life:
  - > 100,000 with Shaft Feedthrough
  - > 1,000,000 with Bellows
- Max Temperature:
  - 200C / 392F
  - GNB valves can be designed for higher process temperatures with water cooling or metal seals
- Material
  - Aluminum
  - Stainless Steel 304 or 316
  - Painted Mild Steel A36

# SPECIALTY AND METALLURGICAL VALVES

## C-STYLE GATE VALVES



## PENDULUM VALVES

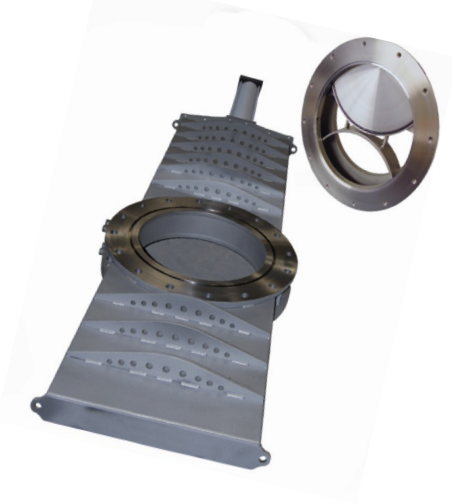


## SLIT VALVES

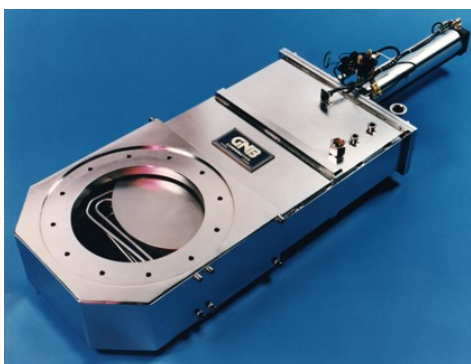


## PMG GATE VALVES

PROTECTIVE METAL GUARDRING



## HIGH TEMPERATURE GATE VALVES



## GATE VALVES



# Pumps



# SCREW PUMPS

## SINGLE-STAGE SCREW PUMPS



Hanbell's single-stage screw pumps contain uniformly pitched rotors or screws and are best suited for moderate to large gas loads. They are “dry” pumps with virtually no back-streaming. The screw design also allows them to push debris through making them robust in the face of dust or other particulates. A blower may be added to these pumps to increase pumping speed and decrease the ultimate pressure.

- Pumping Speed Range: 80-1800m<sup>3</sup>/hr, 47 – 1060 cfm
- Ultimate Pressure ~7.5x10<sup>-3</sup>—7.5x10<sup>-4</sup> Torr
- Inlet Flange Size: KF50-ISO160
- Motor Options: 3-Phase, 50 or 60Hz, 220V or 380V
- Other Options: Air, Water, or self-cooled, various screw coatings, basic or PLC controller, hot N<sup>2</sup> purge, covers, blower, inverter(s)

## DUAL-STAGE SCREW PUMPS



Hanbell's dual-stage screw pumps are similar to the single-stage pumps but have variable pitched rotors. This provides higher pumping speeds at higher pressures and lower power consumption. A blower may be added to these pumps to increase pumping speed and decrease the ultimate pressure.

- Pumping Speed Range: , 80-3600m<sup>3</sup>/hr, 47 – 2118 cfm
- Ultimate Pressure ~7.5x10<sup>-3</sup>—7.5x10<sup>-4</sup>
- Inlet Flange Size: KF50-ISO200
- Motor Options: 3-Phase, 50 or 60Hz, 220V or 380V
- Other Options: Air, Water, or self-cooled, various screw coatings, basic or PLC controller, hot N<sup>2</sup> purge, covers, blower, inverter(s)

# RVP PUMPS

## PX Series – Single Stage Rotary Vane Pump



Rotary vane pumps are the most affordable pump option. They implement an oil seal between vacuum and atmosphere allowing for easy and effective pumping solutions perfect for small to moderate gas loads. Hanbell's PX Series are single stage rotary vane pumps offered with the following options:

- Pumping Speed Range: 10 to 630 m<sup>3</sup>/hr (6 – 370 cfm)
- Ultimate Pressure: ~0.1-2 mBar (0.08-1.5 Torr)
- Inlet Flange Size: G1/2"-G2", DN100
- Motor Options: Single or 3-Phase Motor, 50 or 60 Hz, 110V-380V

## PZ Series – Dual Stage Rotary Vane Pump



Hanbell's PZ Series is a dual stage rotary vane pump providing greater pressure range than the single stage and are perfect for backing a Turbo Molecular Pump. The PZ Series is offered with the following options:

- Pumping Speed Range: 4-90m<sup>3</sup> /hr (2 – 53 cfm)
- Ultimate Pressure ~0.67-5 Pa (0.01-0.04 Torr)
- Inlet Flange Size: KF25 to KF50
- Motor Options: Single or 3-Phase Motor, 50 or 60 Hz, 110V-380V

# Accessories & Cryo Products



# ACCESSORIES & CRYO PRODUCTS

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## Multicoolant Baffles



**MCB**



**CMCB**

- Sizes 2" (KF50) to 40" (ISO1000), Special sizes optional
  - Leak Rate:  $<1 \times 10^{-9}$  std cc/sec He
  - Body Material: 304 SS
  - Chevron Material: Copper (other options, like Aluminum and SS are available)
  - Surface Finish: Bead Blasted
  - Seals: FKM (Viton) (other options, like Silicone and Buna are available)
- 

## Liquid Nitrogen Trap



- Sizes 3.0" to 35.0" ID (Special sizes optional)
- Leak Rate:  $<1 \times 10^{-9}$  std cc/sec He
- Body Material: 304 SS
- Chevron Material: Copper (other options, like SS, are available)
- Surface Finish: Bead Blasted
- Seals: FKM (Viton) (other options, like Silicone and Buna are available)

# ACCESSORIES & CRYO PRODUCTS

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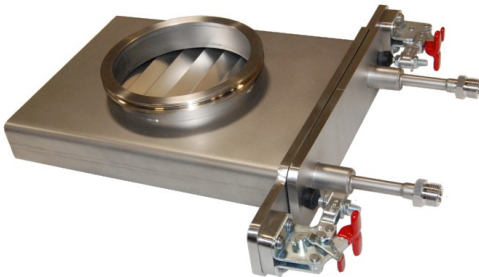
## Foreline Traps



- Sizes: KF16 through KF50 (3/4" through 2")
- Filter Material: Copper Wool
- Filter Type: Sealed
- Surface Finish: Bead Blasted
- Body Material: 304L SS

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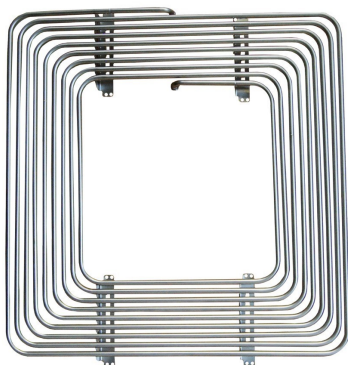
## Cold Traps



- Cold trap constructed of all stainless steel material
- Sizes 3.0" to 35.0" ID (Special sizes optional)
- Leak Rate:  $<1 \times 10^{-9}$  std cc/sec He
- Body Material: 304 SS
- Chevron Material: 304 SS
- Surface Finish: Bead Blasted
- Seals: FKM (Viton) (other options, like Silicone and Buna are available)

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## Meissner Coils



Cryo-coils or Meissner coils are the simplest cryo-product offered. They consist of coiled tubing meant to be placed in vacuum, that allows for a coolant to flow through the tubing. Water molecules or other particles then condense on the coil dropping the overall pressure of the chamber. This product is particularly useful in applications with high water content such as freeze-drying food products. Meissner coils are custom designed for each application.

# ACCESSORIES & CRYO PRODUCTS

## Quick Access Doors



Sizes: 4.5"CF, 6.0"CF, 8.0"CF, 10"CF

- Allows easy access into a chamber
- Available in Blank and Viewport types
- Door Seal: FKM
- Mounting Seal: OFHC Gasket
- Operating Pressure Range:  
760Torr ~  $1 \times 10^{-8}$  Torr
- Leak Rate:  $1 \times 10^{-9}$  Torr L/s He
- Temperature Range: -20degC ~ 150degC
- Bake Temperature: 100degC
- Body Material: 304LSS
- Viewport Material: Glass (only for viewport)

## Viewports



Sizes:

- KF25, KF40, KF50
- 1.33"CF through 10.00"CF
- ISOK63 through ISOK250

- Glass Material: Kodial, Fused Silica, Sapphire
- Flange Style: CF, KF, ISOK
- Flange Material: 304SS
- Operating Pressure Range:  
HV: 760 Torr ~  $1 \times 10^{-8}$  Torr  
UHV: 760 Torr ~  $1 \times 10^{-10}$  Torr
- Leak Rate:  
HV:  $< 1 \times 10^{-9}$  std cc/sec He  
UHV:  $< 1 \times 10^{-10}$  std cc/sec He
- Temperature Range: -20degC ~ 350degC  
(varies based on glass material)

## Shutters



Sizes:

2.75"CF, 4.5"CF, 6.0"CF, 8.0"CF, 10"CF

- Protects a viewport from the deposition of materials in HV and UHV coating applications
- Double-Sided flange mount
- UHV grate rotary drive with thumbscrew for discrete angle positioning
- Bakeable to 250degC
- Shutter Material: Stainless Steel
- Mounting Seal: OFHC Gasket (both sides)
- Operating Pressure Range:  
760Torr ~  $1 \times 10^{-10}$  Torr
- Leak Rate:  $1 \times 10^{-9}$  Torr L/s He
- Temperature Range: -0degC ~ 200degC
- Bakeout Temperature: 250degC
- Body Material: 304LSS
- Feedthrough Type: UHV Rotary Drive
- Mounting Position: Any

# ACCESSORIES & CRYO PRODUCTS

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## Bubblers



- Delivery and storage devices for chemicals
  - DOT approved
  - Volumes (standard): 100mL, 200mL, 500mL, 1L, 1.2L, 2.5L, 4L, 5L, 8L
  - Leak Rate:  $<1 \times 10^{-9}$  std cc/sec He
  - Service Pressure: 300 psi
  - Test Pressure: 600 psi
  - Burst Volumetric Expansion Rate:  $<10\%$
  - Surface Finish, Interior and Exterior: Electropolished Ra 0.3 and below
- 

## Feedthroughs



- Baseplate Options: CF and KF
  - Baseplate Materials: 304SS
  - Conductor Material: 304SS, OFHC
  - Voltage: 5000V
  - Current: 7A (for 304SS), 180A (for OFHC)
  - Insulation: Alumina Ceramic
  - Vacuum Range: 760 Torr  $\sim 1 \times 10^{-8}$  Torr
  - Temperature Range: -100degC  $\sim$  500degC
- 

## Heaters



- Molded heater jackets for vacuum products including check valves, poppet valves, chain clamps, pipe clamps, elbows, straight tube, manifolds, and more.
- Split design for easy installation
- Hybrid super thermal insulation

# NANOPURE

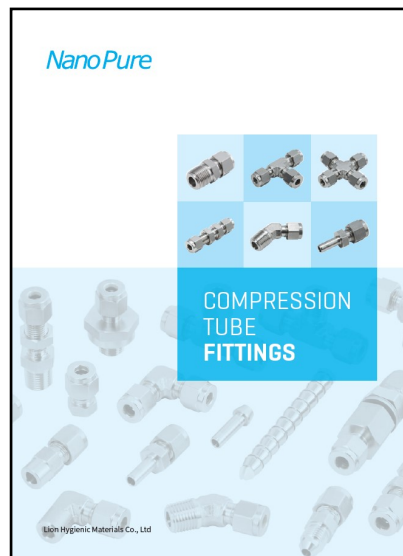
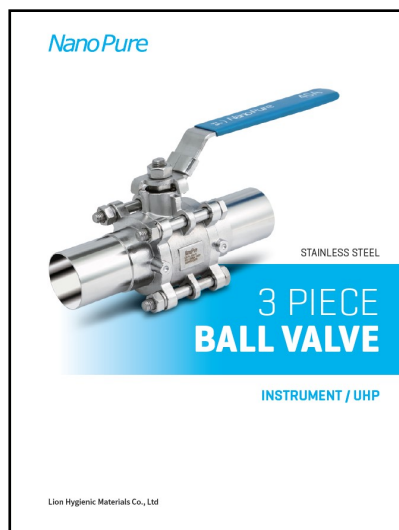
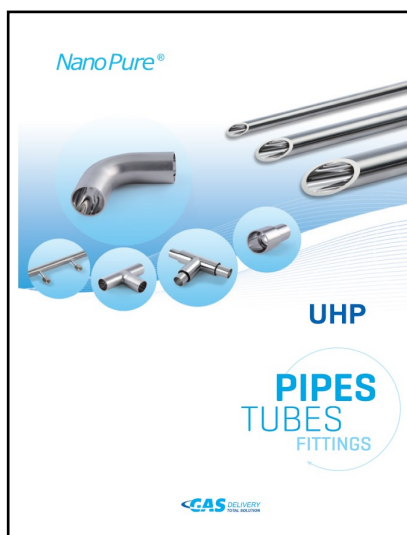


NanoPure is a brand founded by the King Lai Group to provide a total solution for gas delivery applications. Consisting of various tubing/piping, fittings and valves, the NanoPure products are high quality hygienic materials manufactured for the semiconductor, FPD, LED and photovoltaic industries. Check out our website for the full product range and capabilities.



<http://www.advantorr.com/download-2#high-purity>

# NANOPURE FAMILY



<http://www.advantorr.com/download-2#high-purity>

# Standard Components



# STANDARD COMPONENTS

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## CF Flanges & Fittings



- Vacuum Rating: UHV (Ultra High Vacuum)
- Material: 304LSS (Options for 316LSS and 316LNSS)
- Flange Sizes: 1.33"CF to 16.5"CF
- Tube Sizes: ½" to 14.0"
- Vacuum Range: 760 Torr ~  $1 \times 10^{-10}$  Torr
- Gasket Material: OFHC Copper
- Temperature Range: -190degC ~ 450degC

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## ISO & NW Flanges & Fittings



- Vacuum Rating: HV (High Vacuum)
- Material: 304LSS (Options for 316LSS and Aluminum)
- Flange Sizes: ISO63 to ISO630
- Tube Sizes: 2.5" to 26.0"
- Vacuum Range: 760 Torr ~  $1 \times 10^{-8}$  Torr
- Gasket Material: FKM, FFKM
- Temperature Range:  $\leq 200$ degC (150degC sustained)

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## Butt Weld Fittings



- Weldable fittings including
  - Tubing
  - 45deg and 90deg Elbows
  - Conical Reducers
  - Equal Tees and Reducing Tees
  - 4-way, 5-way and 6-way Crosses
- Suitable for welding to any flange or fitting with same tube size
- Tube Sizes: ½" to 6.0" OD
- Material: 304LSS

# STANDARD COMPONENTS

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## KF/DN Flanges & Fittings



- Vacuum Rating: HV (High Vacuum)
  - Material: 304LSS (Options for 316LSS and Aluminum)
  - Flange Sizes: KF10 to KF50
  - Tube Sizes: ½" to 2.0"
  - Vacuum Range: 760 Torr ~ 1x10<sup>-8</sup> Torr
  - Gasket Material: FKM, FFKM
  - Temperature Range: ≤200degC
- 

## Adaptors



- Vacuum Rating: HV (High Vacuum)
  - Material: 304LSS (Options for 316LSS and Aluminum)
  - Adapts from one flange style to another flange or fitting style
  - Adapter Options: CF, KF, ISO, Quick Coupling, VCR, Two-Ferrule, NPT
- 

## Bellows & Flexible Hoses



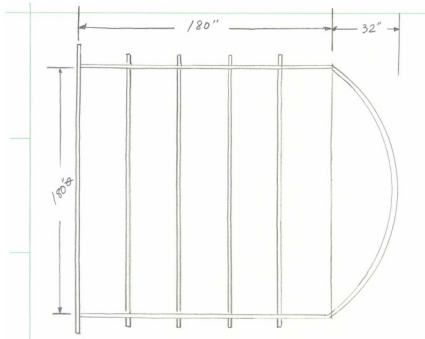
- Metal Bellows and Metal Hose
  - Accommodates flange misalignments
  - Provides vibration dampening
- Bellows and Hose Sizes: 0.75" to 6.0"
- Flange Styles: CF, KF, ISOK
- Material: 304LSS

# Chambers

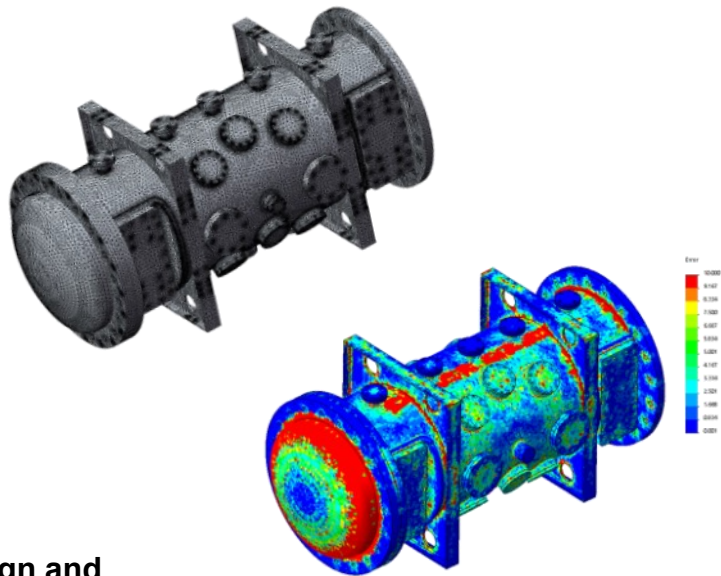
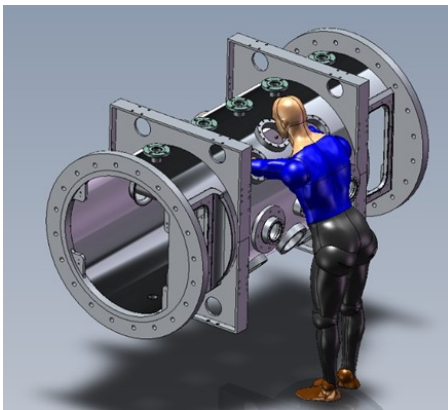


# GNB CHAMBERS

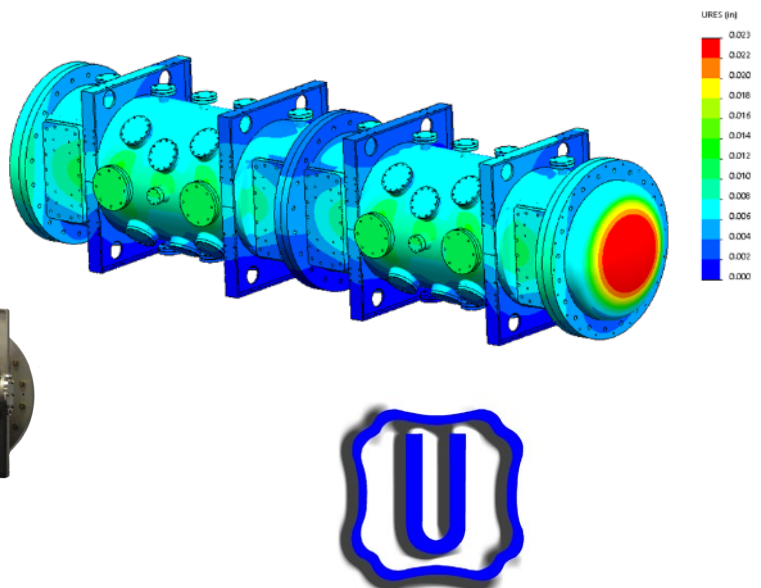
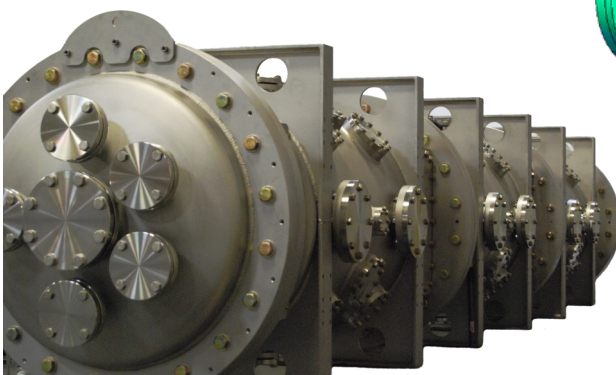
Our chambers are produced in our 70,000 sq.ft. facility in Elk Grove, CA  
Free consulting on Chambers



GNB chamber design process



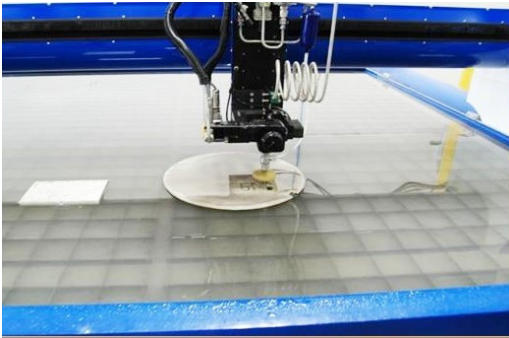
GNB has an ASME U-Stamp to design and produce pressure vessels



# GNB CHAMBERS

## Cutting

- Waterjet 12ft. X 8ft. (3657mm x 2438mm)
- Saw: 13' (330mm)



## Welding

- TIG and MIG welding of Aluminum and Steel
- Lifting capacity 30tons
- ASME Certified Welders
- 2 CWI's on Site



# GNB CHAMBERS

## Machining

- CNC milling up to 168" sq
- Turning up to 108"
- High Speed Machining of Aluminum



Variety of Machines



## Surface Treatment

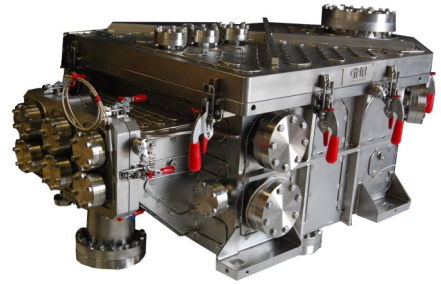
- In house graining and blasting (15ft x 12ft x 12ft)
- Painting
- Various cleaning processes available



# GNB CHAMBERS

## Assembly, Leak Test and RGA

- All chambers will get helium leak tested prior to shipment
- GNB can perform RGA scans at room temperature and elevated temperatures
- GNB can perform bake outs



## Shipping

- GNB can arrange worldwide shipping



# GNB CHAMBERS



# GNB CHAMBERS





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