

MIRO Innovation Vacuum Valve Manifold Design Requirements



General Design Requirements

The vacuum valve manifold design drawings remain the customer's property. MIRO Innovation manufactures only on the customer's behalf and keeps all information strictly confidential; only one-sided exterior photographs may be used for promotional purposes. MIRO Innovation provides the relevant vacuum-valve dimensions. The customer is responsible for proprietary design data including conductance paths, layout, and external dimensions of the manifold.

- Normally closed vacuum valves are installed by default. Specify separately if double-acting or normally open valves are required.
- Valve seat material: A6061 (T6).
- For KF16 valves, refer to the "NAC-KF16 Valve Body" and "NAC-KF16 Valve Core" drawings.
- For KF25 valves, refer to the "NAC-KF25 Valve Body" and "NAC-KF25 Valve Core" drawings.
- For KF40 valves, refer to the "NAC-KF40 Valve Body" and "NAC-KF40 Valve Core" drawings.

The customer's drawings do not need to specify the surface roughness of the vacuum sealing faces. MIRO Innovation will machine and polish each sealing face and leak-test every seal individually.

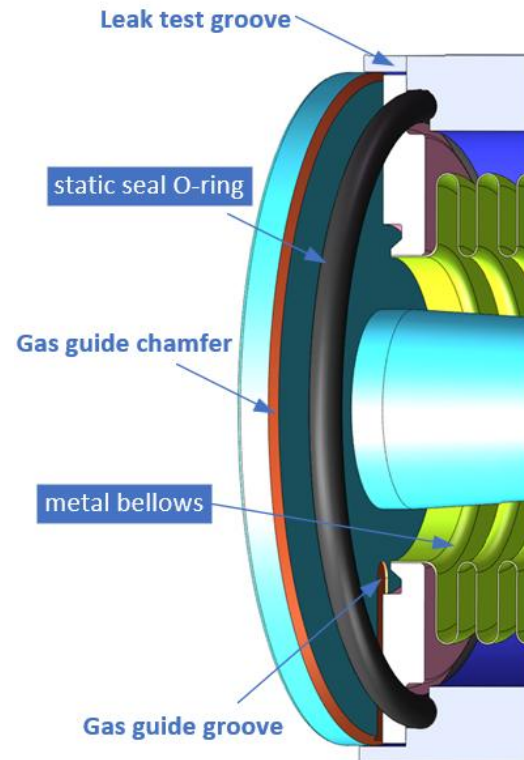
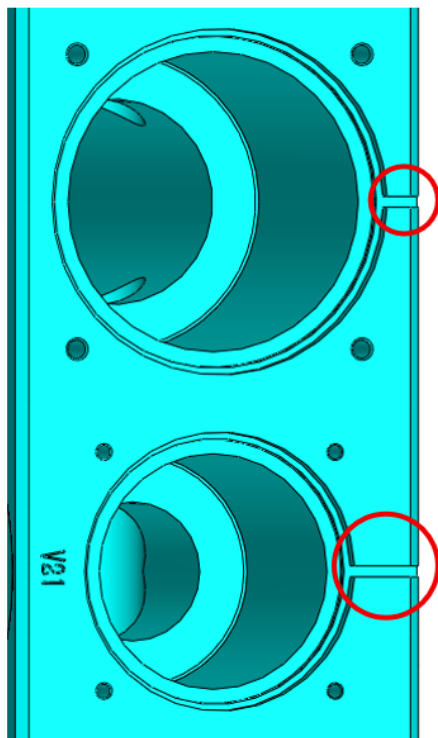
Vacuum Valve Technical Data

- Bellows, valve plate, and flange: SUS316L. Sealing ring: FKM.
- Service life: more than 10 million cycles for KF16 and KF25 valves, and more than 15 million cycles for KF40 valves.
- Opening/closing times: KF40, 0.3 s / 0.6 s; KF25, 0.2 s / 0.4 s; KF16, 0.2 s / 0.3 s.
- Maximum manifold operating pressure: 2.0 bar gauge (3.0 bar absolute).
- Cylinder drive pressure: 3.5-7 bar (typical 6 bar). Install a 10 um dust filter upstream of the air inlet.
- Only Hall-effect magnetic switches are supported. Optional models: D-M9B/D-M9BV (SMC) and EMSH/DMSH (AirTAC).

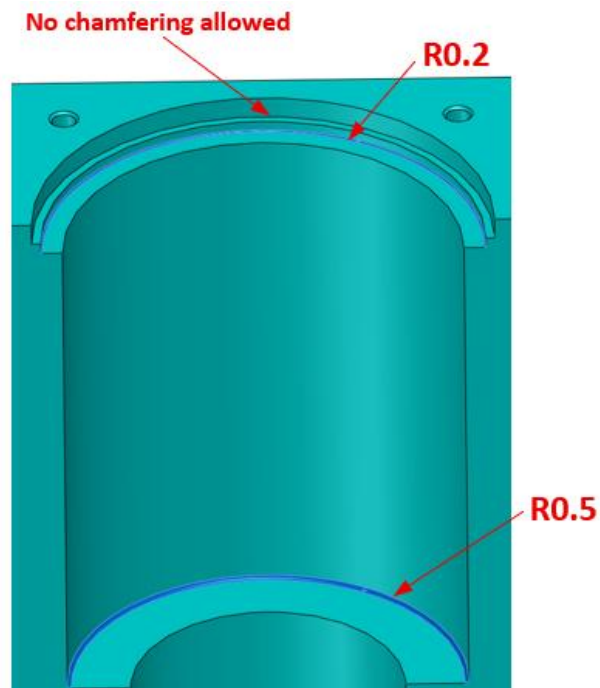
Valve Seat Design Notes

When designing the vacuum valve manifold, review the following commonly overlooked details to avoid repeated revisions.

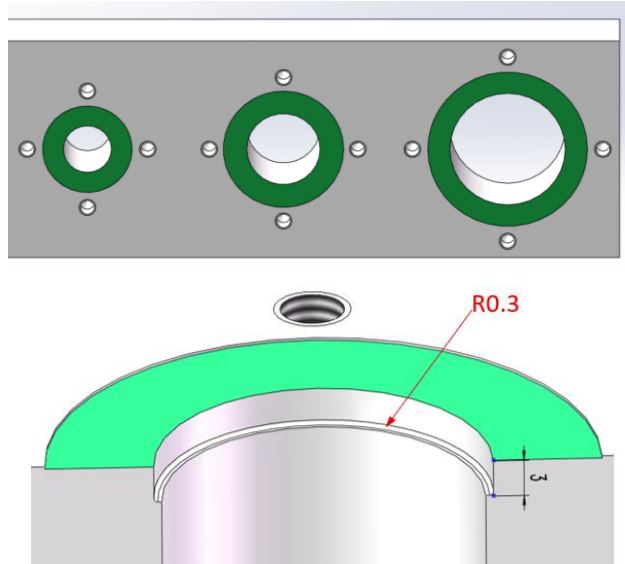
1. As shown below, every vacuum valve must have a leak-test groove positioned on an easily accessible side.
 - During leak testing, helium flows through the leak-test groove and gas-guide chamfer and spreads evenly around the static O-ring to verify the static seal.
 - During leak testing, helium flows through the leak-test groove, gas-guide chamfer, and gas-guide groove into the bellows, allowing the bellows to be leak-tested.
 - If the cylinder dynamic seal leaks, compressed air can vent through the gas-guide groove, gas-guide chamfer, and leak-test groove, protecting the bellows and the vacuum interior.



2. Two radii are required inside the vacuum valve mounting bore. The sealing faces at these locations require extensive grinding and polishing; the radii make cleaning significantly easier. To facilitate ultrasonic cleaning, avoid right-angle and sharp-corner features inside the valve seat wherever possible.



3. For flange sealing-face design, refer to the CAD drawing "Valve Seat Sealing Surface".



- The KF16, KF25, and KF40 sealing-face diameters are 33 mm, 43 mm, and 58 mm, respectively, and are recessed by 0.2 mm to protect the sealing surfaces. When operating pressure exceeds 1.5 bar gauge, the centering ring must include an external support. The support diameters must not exceed 32 mm, 42 mm, and 57 mm, respectively.
- Recommended flange bore diameters for KF16, KF25, and KF40 are 17.2 mm, 26.2 mm, and 41.2 mm, respectively. This eliminates the shoulder feature and simplifies cleaning after flange grinding and polishing. If 16 mm, 25 mm, and 40 mm bores are used instead, provide a shoulder of at least 3 mm and add an R0.3 radius at the shoulder.

