

TILTING VACUUM CHUCK

USER'S MANUAL

1. OVERVIEW

The Tilting Vacuum Chuck is a compact laboratory fixture designed to securely hold small, flat workpieces under vacuum while allowing the work surface to be tilted from **0° to 90°**. It is intended for positioning samples or devices during imaging, inspection, alignment, and other laboratory operations.



2. SPECIFICATIONS

Base footprint	1.00 in x 1.00 in
Work plate size	1.00 in x 1.00 in
Work plate thickness	2 mm (0.08 in)
Adjustment range	0° to 90°
Vacuum connection	Hose barb for 1/16 in ID tubing
Holding method	Vacuum
Intended environment	Laboratory use

3. COMPONENTS

Work Plate

Vacuum surface that contacts and holds the workpiece.

Pivot Screw (Shoulder Screw)

Upper screw. Fixed pivot (rotation point) about which the work plate rotates.

Adjustment / Locking Screw

Lower screw. Loosen to adjust the angle. The screw travels along the arc; tighten it to lock the plate at the desired angle.

Vacuum Port

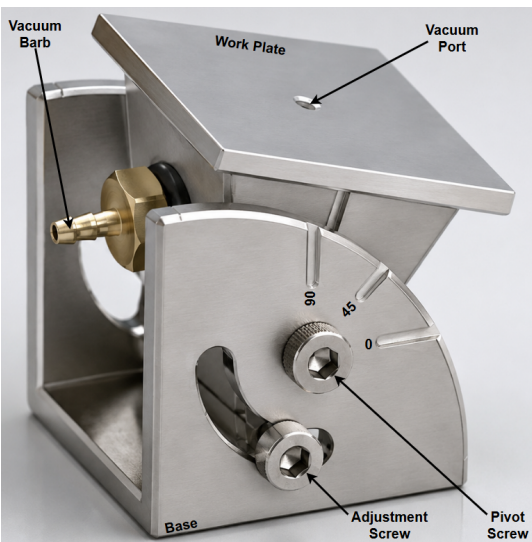
Opening in the work plate through which vacuum is applied to the workpiece.

Vacuum Barb

Hose barb for connection to 1/16 in ID vacuum tubing.

Base

Supports the chuck on the laboratory fixture, stage, or tooling surface.



4. INSTALLATION

4.1 Position the Chuck

- Place the chuck on a clean, flat laboratory stage or work surface.
- Ensure the base is fully supported and cannot shift during angle adjustment or use.

4.2 Connect Vacuum

- Attach 1/16 in ID vacuum tubing to the hose barb on the side of the chuck.
- Push the tubing fully onto the barb to minimize leakage.
- Connect the opposite end of the tubing to the laboratory vacuum source or vacuum-control system.

4.3 Check for Leaks

- Apply vacuum and verify that the vacuum path is unobstructed and that the system holds vacuum before installing a workpiece.

5. OPERATION

5.1 Place Workpiece

- Ensure the work plate and underside of the workpiece are clean, flat, and free of debris.
- Place the workpiece over the active vacuum area of the work plate.

5.2 Apply Vacuum

- Turn on the vacuum source and verify that the workpiece is securely retained before changing the chuck angle.

5.3 Adjust Angle (0° to 90°)

- Support the work plate as necessary, then loosen the **lower Adjustment / Locking Screw** only enough to permit movement.
- Tilt the work plate to the desired angle. The **upper shoulder screw remains the fixed pivot point**.
- The lower screw travels along the curved slot as the stage is tilted.
- Adjustment is continuous from 0° (horizontal) to 90° (vertical).

5.4 Lock the Angle

- Tighten the lower Adjustment / Locking Screw at the selected position to lock the stage.
- Gently verify that the work plate is mechanically secure before proceeding with imaging, inspection, or measurement.

NOTE

Do not loosen the upper shoulder screw for normal angle adjustment. It serves as the rotation point for the tilting stage.

6. VACUUM OPERATION

Vacuum holding force depends on the applied vacuum, effective sealed area beneath the workpiece, surface condition, workpiece geometry, and leakage through unused openings.

- For best performance, ensure the workpiece is flat, clean, and non-porous.
- Cover or seal unused vacuum openings in the work plate when the application allows.
- Do not assume the workpiece is secure solely because vacuum is present. Verify retention before tilting the chuck, especially at large angles.
- Use a vacuum level appropriate for the workpiece, tubing, and laboratory vacuum source.

CAUTION

The chuck is intended for laboratory use only.

At elevated tilt angles, especially near 90°, position equipment so that a workpiece released by loss of vacuum cannot fall onto sensitive optics, instrumentation, or personnel.

Do not use the chuck as a safety-critical restraint.

Before removing a workpiece, return the chuck to a convenient orientation when practical and release vacuum. Do not forcibly pull a workpiece from the plate while significant vacuum is applied.

7. CLEANING AND MAINTENANCE

- Keep the work plate clean to maintain good vacuum sealing and positioning accuracy. Wipe with a lint-free cloth and use appropriate laboratory cleaning methods as needed.
- Inspect the vacuum tubing, hose barb, shoulder screw, curved adjustment slot, and lower locking screw periodically for wear, damage, contamination, or looseness.
- If vacuum performance decreases, inspect the tubing connections and work surface for leaks or contamination before increasing applied vacuum.
- Store the chuck in a clean, dry environment when not in use.

8. QUICK REFERENCE

To adjust angle	Loosen lower screw -> tilt stage about upper shoulder screw -> tighten lower screw
Angle range	0° horizontal to 90° vertical
Vacuum tubing	1/16 in ID
Work plate	1.00 x 1.00 in, 2 mm thick
Base footprint	1.00 x 1.00 in