

HEATED VACUUM WORK HOLDER

Laboratory User Instructions & Operating Procedure

HOT SURFACE - UP TO 150 °C (302 °F)

Treat the work plate, cover material, workpiece, fasteners, clamps, and adjacent metal as hot until adequately cooled.

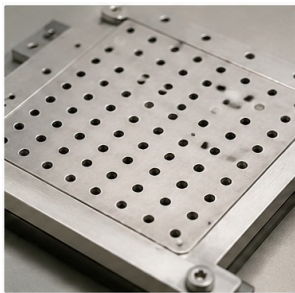
1. Purpose

This heated vacuum work holder secures samples against a perforated work plate using vacuum. Any vacuum paths not covered by the workpiece should normally be sealed to reduce leakage and preserve holding force. Groups of unused holes may be covered with a thin, non-porous metal sheet or foil, while individual threaded holes may be plugged with appropriately sized grub/set screws.

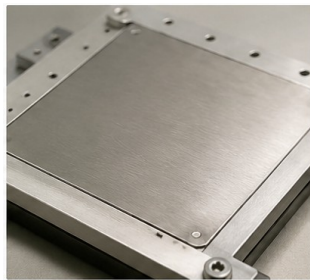
2. Typical Use Cases

Wire bonding	Holding substrates, packages, carriers, or small assemblies flat and stable during bonding.
Manual assembly	Part placement, alignment, soldering, adhesive work, inspection, rework, or other bench assembly operations.
Hot-plate baking	Baking, curing, drying, or other thermal processing where good contact with the heated plate is beneficial.
Optical / microscope work	Repeatable positioning during imaging, probing, inspection, or alignment.
Custom fixturing	Using the threaded hole pattern for clamps, stops, locating features, or experiment-specific fixtures.

3. Vacuum Hole Functions



Open holes not beneath the workpiece create a vacuum leak.

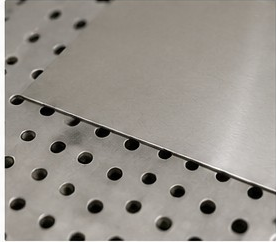


A thin metal cover can seal groups of unused holes.

Threaded mounting grid

- Leave holes open beneath the workpiece for vacuum.
- Plug individual unused holes with grub/set screws.
- Bolt down compatible clamps, stops, locating devices, or fixtures.

4. Covering or Plugging Unused Holes



Metal cover method

Use a thin, flat, non-porous metal sheet or foil over groups of unused holes. Stainless steel is one suitable option, but other metals may also be used when compatible with the experiment, vacuum environment, and operating temperature. Examples may include aluminum, copper, nickel alloys, or other clean metal foils/sheets. A thickness around 0.05-0.15 mm (0.002-0.006 in) is a useful starting range when a flexible cover is desired.

Threaded plug method

Correctly sized grub/set screws may be used to seal individual holes. Engage only as deeply as necessary. Do not force an incorrect thread or use a fastener long enough to damage or obstruct the internal vacuum passage.

Material selection note: Cover materials should be clean, non-porous, sufficiently flat, and suitable for the maximum process temperature. Avoid materials or surface treatments that can soften, outgas, shed particles, oxidize excessively, contaminate the workpiece, or react with the process.

5. Mechanical Clamps and Locating Devices

The threaded vacuum-hole pattern may also be used to attach clamps, stops, locating pins/fixtures, or other experimental hardware. This is useful for repeatable positioning, supplemental restraint, or workpieces that cannot be held by vacuum alone. Use compatible fasteners with adequate thread engagement without excessive penetration into the vacuum passage. Keep hardware clear of the active work area and use components appropriate for the expected temperature and experiment.

6. Startup Procedure

1. Clean the work plate and verify that the vacuum holes and threads are free of debris.
2. Place and align the workpiece.
3. Install any required clamps, stops, or locating fixtures.
4. Identify every vacuum hole that remains exposed and is not intentionally being used.
5. Seal unused holes with an appropriate metal cover and/or correctly sized threaded plugs.
6. Confirm that the workpiece, covers, plugs, and mechanical fixtures are properly positioned.
7. Apply vacuum and gently verify that the workpiece cannot slide or move before beginning work.

7. Vacuum Verification

Once vacuum is applied, atmospheric pressure pulls the workpiece against the plate and also pulls a thin cover sheet/foil flat over unused holes. Threaded plugs provide an alternative way to close individual vacuum paths.

If holding force is weak: check for uncovered or unplugged holes, loose plugs, debris, poor workpiece flatness, disconnected tubing, blocked passages, or inadequate vacuum.



8. Heated Operation

The work plate may reach approximately 150 °C (302 °F). Do not touch the plate, workpiece, metal cover, plugs, clamps, or attached hardware with bare hands while hot. Use appropriate laboratory PPE or heat-resistant tools and allow adequate cooling before adjustment or removal. During heating, periodically confirm that the workpiece remains secure and that the vacuum and mechanical fixtures remain stable.



Combined fixturing is permitted.

Vacuum hold-down, metal cover sheets/foils, threaded plugs, and bolted locating or clamping hardware may be used together as appropriate for the experiment.

9. Shutdown and Removal

1. Turn off the heater and allow the plate, workpiece, plugs, and attached hardware to cool to a safe handling temperature.
2. Release or disconnect the vacuum and confirm that the workpiece is no longer held.
3. Remove the workpiece and temporary clamps, fixtures, cover material, or plugs as required.
4. Clean and inspect the work surface and threaded holes for the next user.

10. Cleaning and Inspection

Keep the work surface, threaded holes, metal cover material, and mounting hardware clean. Replace cover material that is heavily creased, torn, contaminated, oxidized, or unable to lie flat. Inspect threaded holes and plugs for contamination or damaged threads. Do not scrape the work plate with hard or sharp tools, and do not push debris into the vacuum passages.

11. Quick Reference

BEFORE	DURING	AFTER
Clean plate and threads Position workpiece Install fixtures Seal unused holes Apply vacuum Verify secure hold	Apply heat if required Treat all metal as hot Verify vacuum Verify workpiece and fixtures	Turn off heater Allow to cool Release vacuum Remove temporary hardware Clean plate and threads
KEY RULE: Any vacuum hole not beneath the workpiece should be sealed unless intentionally used for another purpose. Use a suitable thin metal cover for groups of holes or appropriate threaded plugs for individual holes; use the threaded pattern for compatible clamps and locating fixtures as needed.		