

## Maintaining Thermal Vacuum Chamber Performance

### CHECKLIST

#### BEFORE CHAMBER LOADING

- ☐ Wipe down chamber interior with lint-free wipes and vacuum-compatible solvents (IPA, acetone).
- ☐ Inspect thermal shrouds, platens, and feedthroughs for dust, oils, or residue.
- ☐ Clean test articles per contamination control plan; pre-bake under vacuum if possible.
- ☐ Verify gowning protocol — gloves, smocks, shoe covers, and hairnets to prevent particle/oil transfer.

#### MOISTURE CONTROL

- ☐ Keep chamber sealed when not in use; always backfill with dry nitrogen, not air.
- ☐ Purge chamber lines through inline dryers or desiccant to avoid humid air entry.
- ☐ Check humidity levels in integration area; keep within controlled cleanroom specs if possible.
- ☐ Pre-bake test articles to remove bound water before installation.

#### SEAL & HARDWARE INTEGRITY

- ☐ Inspect O-rings for cracks, debris, or flattening.
- ☐ Apply vacuum-compatible lubricant to seals as required.
- ☐ Check all flanges, ports, and viewports for uniform tightening.
- ☐ Perform helium leak check before pump-down to confirm seal integrity.

#### PUMPING SYSTEM

- ☐ Inspect roughing and turbo pumps; confirm service intervals and oil changes are up to date.
- ☐ Verify cryopumps or cold traps are regenerated and clean.
- ☐ Ensure molecular sieves or traps are installed for water vapor capture.
- ☐ Log pump maintenance records and review prior to each test campaign.

#### OPERATIONAL DISCIPLINE

- ☐ Limit exposure time — do not leave the chamber open longer than necessary. Use nitrogen purge whenever opening or closing the chamber.
- ☐ Follow load/unload checklist consistently for every test.
- ☐ Train operators to identify risks like fingerprints on flanges, lint, or unbaked hardware.



Following this checklist reduces pump-down times, improves vacuum quality, and protects sensitive spacecraft hardware from contamination.