

Semiconductor Vacuum-Chamber Components in Aluminum & Molybdenum

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This solution looks at how VT machining manufactures **vacuum-chamber components, gas-distribution plates and electrodes for wafer-processing equipment** for the semiconductor sector, and how process and material choices combine to hit demanding requirements. It is written as a starting point for your own design discussion — every part is ultimately quoted and engineered to your drawing.

The natural first choice for this kind of component is [MIC-6 Aluminum](#). MIC-6 is a stress-relieved cast aluminum tooling plate prized for dimensional stability and flatness, ideal for large vacuum-chamber plates that must stay flat after machining.

Why MIC-6 Aluminum?

MIC-6 Aluminum is specified here because of how its properties match the duty of vacuum-chamber components, gas-distribution plates and electrodes for wafer-processing equipment. We confirm the exact grade, temper or heat-treat condition with you before machining, and can supply material certificates for traceability. See our dedicated [CNC Milling MIC-6 Aluminum](#) capability page for process-and-grade detail.

Material Alternatives & Substitutions

Depending on cost, corrosion, strength or weight priorities, several alloys can substitute for MIC-6 Aluminum. Each links to its machining capability page:

Alternative	When to choose it
6061 Aluminum	general-purpose structural aluminum, weldable and anodisable
2205 Duplex Stainless Steel	high strength and chloride resistance for corrosive process environments
316L Stainless Steel	clean, corrosion-resistant standard for vacuum and gas-wetted parts

Recommended Process Routes

For vacuum-chamber components, gas-distribution plates and electrodes for wafer-processing equipment, the core shaping operations are usually:

- [CNC Milling](#) — primary shaping of the main geometry.
- [CNC 5-Axis Machining](#) — primary shaping of the main geometry.
- [CNC Surface Grinding](#) — primary shaping of the main geometry.

High-Tolerance Process Combination

Where the drawing calls for flatness within a few microns over large plates, fine-pitch gas holes and a clean, particle-free surface, a single operation is rarely enough. We recommend combining processes in sequence so each stage refines the last:

1. [CNC Surface Grinding](#) — rough and semi-finish the part close to net shape, leaving controlled stock for finishing.
2. [CNC Milling](#) — bring critical features to final size and geometry with a precision finishing pass.
3. [CNC Wire EDM](#) — produce the tightest features or hardened-material details that cannot be cut conventionally.
4. [CNC Polishing](#) — achieve the final surface finish, edge condition and cosmetic quality.

Sequencing the work this way isolates roughing distortion from the finishing stages, which is how tight tolerances are held repeatably in production. We plan the exact route from your tolerance scheme and first-article results.

Feature & Secondary Operations

Additional features and finishing are added with:

- [CNC EDM Drilling](#)
- [CNC Drilling](#)
- [CNC Tapping](#)
- [Chemical Etching](#)

Related Applications

This solution supports the following application areas — each shows the broader range of parts and materials we make for that industry:

- [Semiconductor Equipment](#)

Standards & References

Relevant standards for this kind of work include SEMI standards (equipment), ASTM B209 (aluminum plate). These are cited for guidance only; we work to the standards and revisions named on your drawing.

Authoritative public references used in preparing this overview:

- [Aluminium alloy designations and tempers](#)
- [Molybdenum properties \(high melting point, low CTE\)](#)

Frequently Asked Questions

What is the best material for vacuum-chamber components, gas-distribution plates and electrodes for wafer-processing equipment?

MIC-6 Aluminum is the usual first choice because MIC-6 is a stress-relieved cast aluminum tooling plate prized for dimensional stability and flatness, ideal for large vacuum-chamber plates that must stay flat after machining. Alternatives such as 6061

Aluminum, 2205 Duplex Stainless Steel, 316L Stainless Steel are used when cost, corrosion or weight priorities differ.

Which processes hold the tightest tolerances for vacuum-chamber components, gas-distribution plates and electrodes for wafer-processing equipment?

We combine processes in sequence — typically CNC Surface Grinding, CNC Milling, CNC Wire EDM, CNC Polishing — so roughing distortion is separated from finishing and the critical features are produced last.

Can you machine MIC-6 Aluminum to my drawing?

Yes. Send your CAD or 2D drawing, the grade and condition, the quantity and any finish or inspection requirements, and our engineers will confirm feasibility, pricing and lead time — usually within one business day.

What quality documentation can you provide?

Material certificates, dimensional inspection reports and first-article documentation are available on request, aligned to the standards named on your drawing.

Need vacuum-chamber components, gas-distribution plates and electrodes for wafer-processing equipment manufactured to your spec? Send your drawing and quantity for a fast quotation.

[Request a Quote](#)