ELLWOOD

Semiconductor Industry Innovation and Partnership from Engineering through Inventory Management

Customer Case Study



Project Overview

A component systems supplier to a major semiconductor manufacturing OEM approached Ellwood to solve a complex materials challenge within advanced photolithography systems. The customer required exceptionally large aluminum blocks with stringent metallurgical, cleanliness, and inspection requirements. Ellwood engineered a reliable, repeatable casting and qualification process that exceeded the customer's expectations, positioning Ellwood as the single-source supplier of these ultra-large slabs.

Executive Summary

Industry: Semiconductor

Company Type: Multinational OEM & its upstream suppliers

Location: Global Supply Chain

Timeline: From concept to qualified, shipped product in under 7 months

Capabilities Utilized:

- Research Development
- Aluminum Melting
- Inventory Management
- Program Management

Challenge

The OEM's design required its supply chain to develop ultra-large, custom-specification aluminum slabs—far larger and of higher quality than industry norms. The resulting extreme thermal mass created grain-control, porosity-management, and mechanical-property uniformity challenges. Cleanliness and inspection requirements exceeded ultrasonic, grain refinement, and mechanical consistency standards achievable by other suppliers. With advanced photolithography machines forming the backbone of modern semiconductor manufacturing and a global, complex supply chain requiring extreme scale and reliability, the challenge was critical for the ultimate customer's next-generation system success.

Solution

The customer reached out to Ellwood, asking the aluminum casthouse to cast a 5000-series slab large enough to meet its unique needs. As Ellwood engineers collaborated with the customer and explored the challenges, the extreme technical requirements gradually became clear. Ellwood addressed the customer requirements through engineering innovation, process discipline, and supply-chain partnership, eventually collaborating with the customer to write the product specification and deliver a highly proprietary slab.

Technical Innovation

- Developed a massive DC-cast slab to tighter-than-industry specification, at 50.5" (1,283 mm) thick, 96" (2,438 mm) wide, and 95,000 pounds (43,091 kg).
- Advanced casting technology enabled continuous real-time process adjustments.
- Achieved consistent mechanical properties, fine grain structure, and dimensional stability.

Supply Chain Leadership

- Earned sole qualification on the customer's specification.
- Established reliability and repeatability under tight semiconductor-industry timelines.
- Provided program management to manage specialized sawing, testing, and quality program requirements.
- Maintained large-scale inventory to ensure consistent and dependable deliveries

Process Control

- Engineering the casting process as an integrated metallurgical system, not a single-variable adjustment.
- Balanced grain refinement, filtration, and inclusion control to meet cleanliness and structural requirements.
- Customized homogenization cycles for the large thermal mass.
- Implemented rigorous ultrasonic and mechanical testing to ensure full compliance with the end customer's specification.

Customer Collaboration

- Worked closely with immediate and ultimate customers to refine technical requirements, quality systems, and inspection methods.
- Ensured that process controls aligned with customer expectations for consistency and performance.

Result

Ellwood engineered a fully integrated, repeatable process for one of the world's most demanding applications to become the only qualified supplier for these ultra-large aluminum slabs. By consistently delivering material meeting all metallurgical, mechanical, and inspection demands, Ellwood demonstrated its capabilities as a strategic supplier supporting leading photolithography platforms and the global semiconductor supply chain that depends on them.

Connect with an expert.

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