



POLAR PERFORMANCE
MATERIALS



Pure Precision. Proven Performance

Ultra-High Purity Alumina



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Company Brochure



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Our Mission

Deliver high-purity alumina that drives performance where it matters most.

We help customers solve tough problems by providing consistent, contamination-free materials backed by rigorous quality standards and a process that reduces waste and emissions from the start.

Our Vision

Be the most trusted alumina partner in the world.

We want people to choose Polar because they know we'll get it right, move fast, and stand behind the material we deliver.

Pure Precision. Proven Performance

Polar Performance Materials is an alumina company and supplier centered on technical excellence, ultra-high purity, and process integrity.

Our materials are engineered to prevent contamination and alpha particle emission, key factors that impact yield and process reliability in precision applications. And because our process is lean by design, we achieve 5N purity with lower energy use and fewer emissions than traditional methods.

We serve customers in semiconductors, aerospace, sapphire, and other high-performance sectors where failure isn't an option. We win when our customers win, solving their challenges one solution at a time through reliable, high-performing alumina, responsiveness, and collaboration.

From technical support to tailored development, we work alongside our partners to meet their goals. We're not just a materials supplier. We're a committed ally in their success.

If you need materials tested, specifications documented, or batches delivered on schedule, we're the team that gets it done.



Pure Precision. Proven Performance.

Polar Performance Materials has engineered its POLARGuard™ ultra-high-purity alumina for the world's most exacting industries, including Semiconductor, Aerospace, Sapphire, and other high-performance sectors where quality is non-negotiable.

Our proprietary, energy-efficient process delivers alumina with precise particle size control, optimized surface area, and ultra-low impurities enabling maximum yield, process stability, and part performance for our customers.



POLARGuard

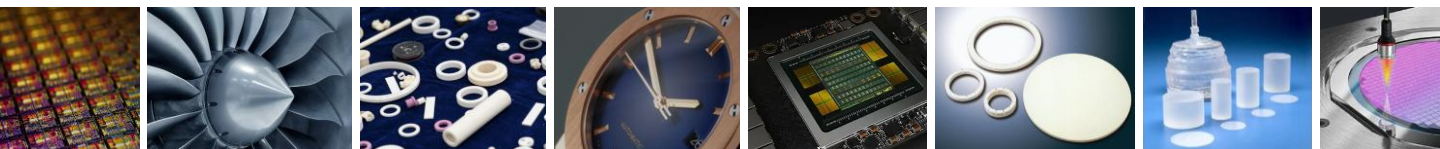
Categories	Engineered For	Customer Benefits
PUREGuard™	Semiconductor	5N purity, superior strength, dielectric properties, low alpha particle emitters
TECHGuard™	Aerospace, Coatings, Medical, Li-Ion	Best resilience in high-temp and harsh condition, biochemical compatibility
CRYSTALGuard™	Sapphire	Eliminating trace contaminants for optimal sapphire growth

Innovation, Purity, and Precision in Every Particle

- **Tailored Purity Levels:** Offering 4N and 5N to meet your industry needs, from semiconductors to technical ceramics.
- **Advanced Manufacturing:** Utilizing proprietary processing technology for unrivalled consistency and quality.
- **Customizable Solutions:** Adaptable properties and additives to fit your specific applications and improve processes.
- **Sustainable Practices:** Built upon an eco-friendly processes that significantly reduces carbon footprint.
- **Expert Support:** Dedicated technical support and R&D partnerships to optimize your part and process outcomes.

The Polar Advantage

- **Your Partner in Performance**
Tailored particle sizes and specific surface areas for critical processes.
- **Eco-efficient Manufacturing:**
Minimizing environmental impact while maximizing purity and quality.
- **Reliable Supply Chain:**
Proven logistics, backed by Polar's commitment to customer satisfaction.





POLARGuard Portfolio

PUREGuard™

UHPA

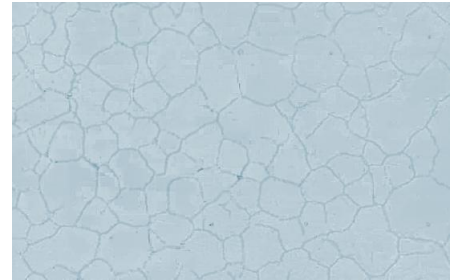
Product Code	Units	5065S	5045S	5170P	5120P
Purity		5N	5N	5N	5N
Crystal Phase		alpha	alpha	alpha	alpha
BET Surface Area	m ² /g	6 - 10	6 - 10	4 - 7	4 - 7
PSD D50	μm	0.55 - 0.8	0.3-0.55	1.4 - 2.0	1.0 - 1.4
Loose Density	g/cc	0.8-1.0	0.8-1.0	0.3-0.5	0.3 - 0.5
Impurities (≤)	Na	ppmw	12	12	12
	Si	ppmw	8	8	8
	Fe	ppmw	5	5	5
	Ca	ppmw	5	5	5



TECHGuard™

UHPA

Product Code	Units	4065S	4045S	4170P	4120P
Purity		4N	4N	4N	4N
Crystal Phase		alpha	alpha	alpha	alpha
BET Surface Area	m ² /g	6 - 10	6 - 10	4 - 7	4 - 7
PSD D50	μm	0.55 - 0.8	0.3-0.55	1.4 - 2.0	1.0 - 1.4
Loose Density	g/cc	0.8-1.0	0.8-1.0	0.3-0.5	0.3 - 0.5
Impurities (≤)	Na	ppmw	30	30	30
	Si	ppmw	12	12	12
	Fe	ppmw	10	10	10
	Ca	ppmw	8	8	8



CRYSTALGuard™

UHPA

Product Code	Units	53600	43600
Purity		5N	4N
Crystal Phase		alpha	alpha
Format		puck	puck
Average Fired Density	g/cc	>3.4	>3.4
Average Dimensions (L, W, H)	mm	59,59,39	59,59,39
Average Mass	g	450	450
Impurities (≤)	Na	ppmw	5
	Si	ppmw	6
	Fe	ppmw	5
	Ca	ppmw	4



Customized specifications available

Purity [ppmw]	Na	Mg	Si	Ca	Ti	Cu	Fe	K
4N [99.99%]	≤ 30	≤ 6	≤ 12	≤ 8	≤ 5	≤ 5	≤ 10	≤ 10
5N [99.999%]	≤ 12	≤ 3	≤ 8	≤ 5	≤ 1	≤ 2	≤ 5	≤ 5



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Polar Performance Materials Quality: "The Discipline of Consistency"

At Polar, our quality philosophy is rooted in two essential ideas: Consistency and Continuous Improvement. Consistency means that every kilogram of ultra-high-purity alumina we produce behaves exactly as the previous one, chemically, structurally, functionally. Continuous improvement means that we never accept process variation as permanent: we study it, understand it, and reduce it.

We Test what matters most: Properties that define product performance:



Purity



Particle Size
Distribution



Surface Area



Density



pH

Perfection may sound ambitious, but in our world, it means: the same outcome, every time. Our customers do not like surprises, especially when the material they rely on is mission-critical to semiconductor yield, medical safety, or aerospace resilience.

We take pride in what we are doing, and the way we do it. Our quality policy built around five core commitments reflects it:

- P**rocesses – Executed sustainably, delivering consistent performance in Ultra High-Purity Alumina
- R**equirements – Meeting all customer requirements, effectively and efficiently
- I**mprovement – Identifying risks and taking appropriate action to continuously improve our standards.
- D**ata-Driven – Using data for better decisions to enhance our processes and products.
- E**mployees – Engaged, accountable, and always acting with integrity

We're proud to be certified ISO 9001:2015

But we're not stopping there. Compliance and certifications are a foundation, not a finish line. To be a true quality leader, we must go further. That means being more proactive, more effective, more disciplined, and more precise. It means continuously challenging the status quo for quality, not just inspecting it.



Quality Designed in: Zero Surprises

At Polar, quality is designed in, not only tested in. We apply Statistical Process, Product and Quality Control. We use Design-for-Quality and Design-for-Manufacture principles to ensure quality is structurally embedded from the outset.

Our digital backbone, an integrated QMS, ERP, and MES, has one goal: predictability. When processes are predictable, we become a better supplier, a better partner, and a safer choice for our customers.

Our goal isn't just zero defects. It's also zero surprises that earn our customers' trust.



Sustainability Starts With Purity

Every step of our process is designed to reduce waste, cut emissions, and deliver high-purity alumina with less impact. Through proprietary process innovation, we reduced process steps, chemical use, and energy consumption to deliver a ultra-high purity with a lighter environmental footprint for our customers.

Governance you can build on

At Polar, sustainability is embedded in our governance. We've implemented a ESG framework designed to align with global procurement standards and sustainable sourcing expectations.

Our governance structure includes:

- Environmental, Ethics, Supplier Compliance, and Whistleblower policies
- Integrated anti-bribery, anti-corruption, and IT security protocols
- Environmental policies focused on efficiency, emissions reduction, and responsible resource use
- A third-party verified LCA confirming 90–98% fewer emissions than traditional processes

We work closely with our customers to support sustainability audits, provide verified data, and meet standards set by the Responsible Business Alliance (RBA).



Decarbonization built in

Polar delivers something rare in advanced materials: uncompromising performance and measurable sustainability impact. Our process isn't just cleaner; it's proven to reduce emissions and energy use at scale.

By 2030, Polar's climate-positive impact is expected to exceed 600,000 metric tons of avoided CO₂ emissions. While some define goals, we are delivering results.

75%

Estimated reduction in energy use vs. traditional high-purity alumina production methods like AIH and AAS.

90+ %

Estimated reduction in carbon intensity compared to conventional high-purity alumina.

90–98 %

Lower greenhouse gas emissions than traditional HPA production methods.



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