

**Honeywell Aluminum
Sputtering Targets**

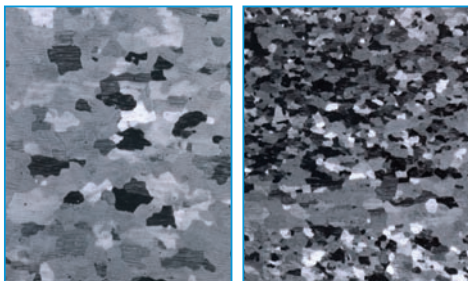
Honeywell Aluminum Sputtering Targets

PURE ALUMINUM IN MOST STANDARD CONFIGURATIONS



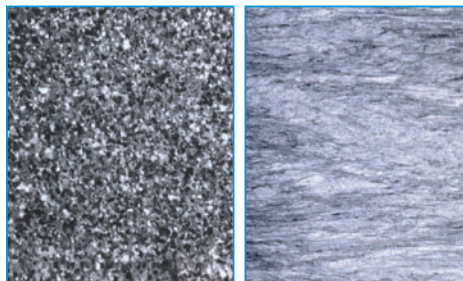
BENEFITS

- Ultrafine, stable grain size
- Patented high strength Aluminum backing plate technology
- Oxide inclusion free
- Low particles
- Development alloys available



Omega-P
(120µm) 100X

APX
(50µm) 100X



ECAE UFG
(8µm) 100X

ECAE SFG
(<1µm) 100X

Statically Recrystallized Dynamically Recrystallized

OVERVIEW

Honeywell Electronic Materials' aluminum (Al) targets provide customers outstanding high-volume production capability combined with low operating costs required for today's advanced semiconductor devices.

Honeywell owns and operates one of the world's largest aluminum sputtering target casting operations, ensuring enough aluminum to meet the entire semiconductor market's high volume demand. Our internal casting, forging and manufacturing capabilities yield the most advanced metallurgy, free of defects with consistent performance from target to target.

APPLICATIONS

Al targets deposit a thin, high conformal seed layer of Al onto titanium (Ti) or titanium nitride (TiN) barrier layers.

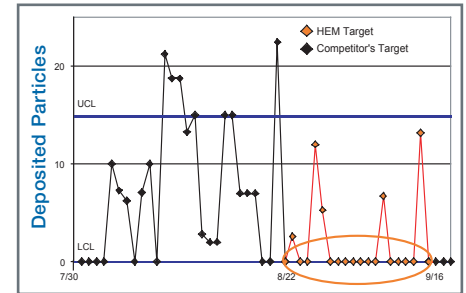
CONFIGURATIONS

- Anelva
- AMAT
- Novellus
- TEL
- Trikon
- ULVAC

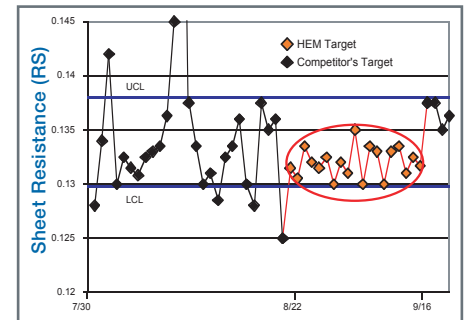
(Most standard target configurations available)

PERFORMANCE

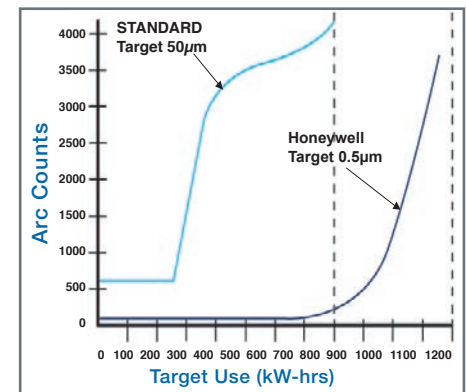
In-Film Particle Comparison



In-Film Sheet Resistance Comparison



Arc Occurrences Over Target Life



TECHNOLOGY COMPARISON

Metallurgical Characteristics	Omega-P	APX	ECAE®*	
			Ultrafine Grain (UFG) Condition	Superfine Grain (SFG) Condition
Microstructure Uniformity	Uniform	Uniform	Highly Uniform	Highly Uniform
Precipitates	<5µm uniform distribution	<5µm uniform distribution	Precipitate Free	Precipitate Free
Average Grain Size	100µm	50µm	<10µm	0.5µm

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