



A300-XP SERIES MAGNETRONS

UHV SPUTTERING SOURCES

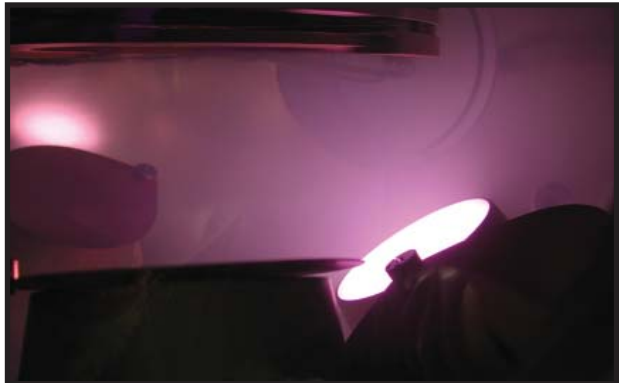
AJA INTERNATIONAL, INC.

GENERAL INFORMATION: A300 Series UHV Sputtering Sources

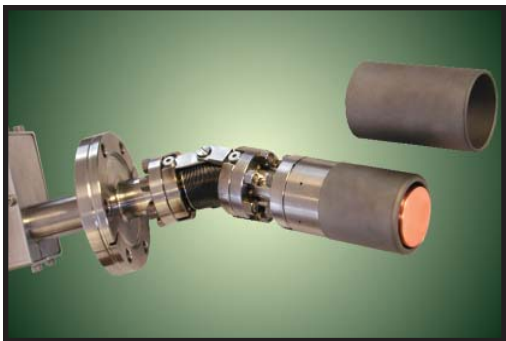
The A300-XP UHV sputtering sources are the next generation, "expanded performance" version of the industry standard A300 SERIES magnetron sputtering sources that have dominated the high end, UHV sputter gun market since 1991. New "expanded performance" features include higher pressure operation, improved magnetic material sputtering performance, and a larger product range. Although our competitors have attempted to incorporate certain "AJA innovations" into their product lines during the last 10 years, the new A300-XP source developments will continue to ensure AJA INTERNATIONAL, Inc.'s position well ahead of the pack in the UHV magnetron market.



The A300-XP SERIES sources have been designed to meet the most challenging application requirements in today's thin film deposition markets. Being a manufacturer of custom R&D and small scale production sputtering systems, AJA International, Inc. understands the needs of this market in intimate detail and can help you solve your process, retrofit and system design/configuration issues.



GENERAL INFORMATION: A310 Series UHV Sputtering Sources



AJA's unique A310 series UHV sources have been designed to fit through the port of a 2.75" flange complete with its tilt gimbals assembly. Retrofitting UHV magnetron sputter sources into existing vacuum chambers can be difficult due to the availability and location of appropriate ports. With AJA International's new A310-XP, one only needs a 2.75" CF (CF38) to accommodate the source head, tilt gimbals and gas injection/isolation chimney. The entire source can be extracted from the chamber without any disassembly. Target changes can be made with one hand either inside or outside of the chamber. This revolutionary new design is true UHV - all ceramic to metal construction. These sources can be combined into multi-gun clusters or be fitted with any sort of custom "goose necked" support tube to point at any spot in the chamber.

The design is ideal for Surface Science chambers and anyone working with small substrates (up to 2" diameter). The A310-XP is suitable for RF and DC operation.

GENERAL INFORMATION: A3CV Series UHV Sputtering Sources

The AJA International, Inc. A3CV series magnetron sputtering sources feature the unique ability to fit multiple target modules onto a common source head subassembly. This flexibility is ideal for R&D applications where the user wishes to sputter various size targets (large magnetic, small precious metal, standard size and custom size) without incurring the cost of multiple sources. A3CV sources are available in both HV and UHV mounting versions and in either axial or right angle configurations. All sources are RF and DC compatible. Gas Injection Chimneys, source head tilt gimbals, integral shutters and power supplies are optional.



A3CV Series sources also feature the unique AJA International "modular magnet array" allowing the source to be operated as a balance magnetron or in a variety of unbalanced configurations. The magnet array is isolated from the cooling water to eliminate magnet deterioration and subsequent degradation of source performance. In the tradition of other AJA magnetron sources, the A3CV Series delivers premium quality and performance at a reasonable price. Maximum flexibility make the A3CV Series the ideal source for R&D applications

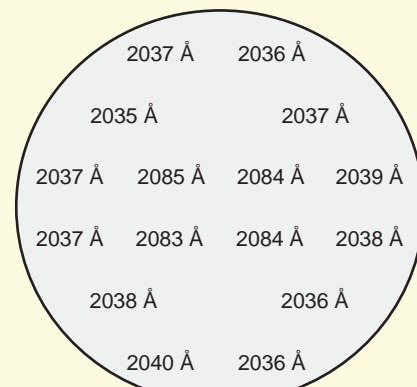
THE UNIQUE MODULAR MAGNET ARRAY

The A300-XP SERIES magnetron sputtering sources feature a unique "modular magnet array" which is completely isolated from the cooling water to eliminate magnet deterioration and subsequent degradation of source performance. This design permits access to the internal magnet arrangement thus allowing the same source to be:

- Operated as a balanced magnetron
- Operated in a variety of unbalanced magnetron configurations
- Configured for maximum target utilization
- Configured for uniform or intentionally non-uniform depositions
- Configured for high or low rate sputtering
- Configured for high or low electron energies as they arrive at the substrate surface
- Operated with thick magnetic material targets, facilitating easy magnetic target removal and replacement

IN-SITU TILT FOR OPTIMUM UNIFORMITY

For angled sputtering configurations with rotating substrates, A300-XP sources are typically fitted with the "in-situ tilt" option. This option, shown at the right, allows the source angle to be precisely adjusted from outside the vacuum chamber. Fine tuning the incident angle is critical to achieving good deposition uniformity when working distances, operating pressures and materials are changed. While fixed angle arrangements limit and often compromise the capabilities of a system, "in-situ tilt" can deliver better than +/- 1.5% uniformity on substrates which can be up to triple the diameter of the source targets.

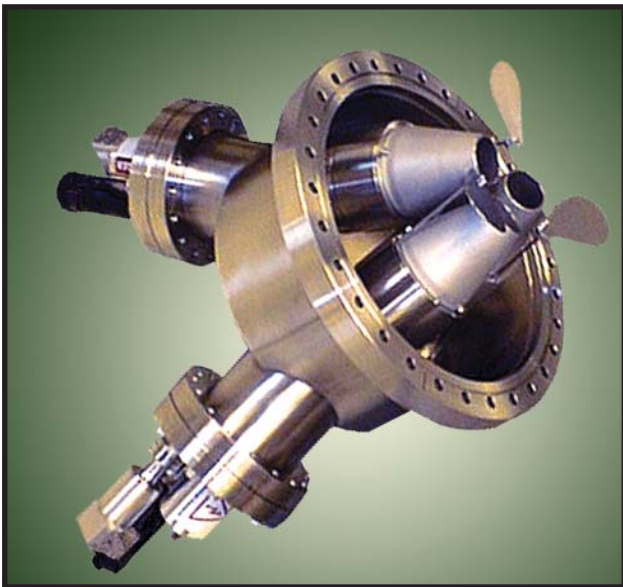


Deposition uniformity with A320-XP (2" target dia.) with in-situ tilt set at 23°, 110 mm working distance, and focused on a rotating, 4.0" diameter, Si wafer. SiO₂ deposition shows +/- 1.2% uniformity.

UHV MAGNETRON SPUTTERING SOURCE CLUSTER FLANGES

As the world leader in flexible magnetron sputtering source design, AJA International, Inc. also manufactures many varieties of UHV cluster flanges, available with in-situ tilt (allowing a variable focal point) or at fixed angles. These flanges integrate anywhere from 2 to 12 sputtering sources onto a single vacuum flange. With the increasing demand for co-deposited thin films of varying stoichiometries and both magnetic and nonmagnetic multilayers, CLF SERIES cluster flanges offer the most extensive range of possibilities currently available on the market. AJA's custom options include: integrated source shutter packages, individual source gas rings and shielding chimneys, ISO, CF, wire seal, baseplate, top plate and dished configurations.

- UHV in-situ tilt configurations to vary incident angle
- Compact, fixed angle configurations with flip-top shutters
- ISO, CF, wire seal, base plate, top plate and dished head versions available
- Individual source gas rings for reactive sputtering applications
- Integrated source shutter packages with automated controllers
- Individual shielding chimneys to eliminate cross-contamination and reduce operating pressure to less than 0.5m Torr



FEATURES / TYPICAL APPLICATIONS

- Modular Magnet Array isolated from cooling water
- Magnetic Material sputtering of thicker targets
- Easy removal of larger magnetic targets
- Integral gas injection and chimney system
- Efficient target cooling with no vacuum/water seals
- Clamped target mounting for optimal heat transfer
- RF & DC compatibility
- True UHV construction (CF & ceramic/metal only)
- Bakeable to 200° without disassembly
- Broad operating pressure (0.1 mTorr to 1.0 Torr)
- In-situ tilt or manual tilt for optimum uniformity
- Custom versions available
- Source / Power Supply / Target packages available

- CD/DVD Disk Coatings (e.g. reflective, phase change)
- Semiconductor
- Conductive Metal / Resistive Metal / Insulating Films
- Transparent Electrical Conductors (e.g. ITO)
- Optical Communications Applications (e.g. pump lasers)
- Lens Coatings (reflexive / anti-reflective / hard / color)
- Precious Metals (for maximum target utilization)
- Thin Film Sensors
- Coatings for Surgical / Medical Implants & Implants
- Magnetic Storage Media and Heads (HD, GMR, TMR)
- Photovoltaic Thin Films (solar cells)
- Wear Resistant Films
- Combinatorial Chemistry (special configurations)

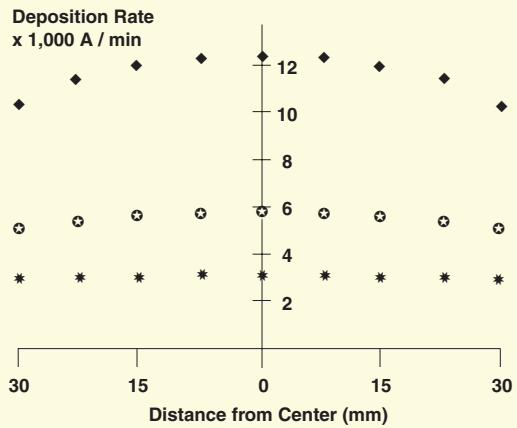
TYPICAL PERFORMANCE

A320-XP / A3CV2.0

PROCESS CONDITIONS:

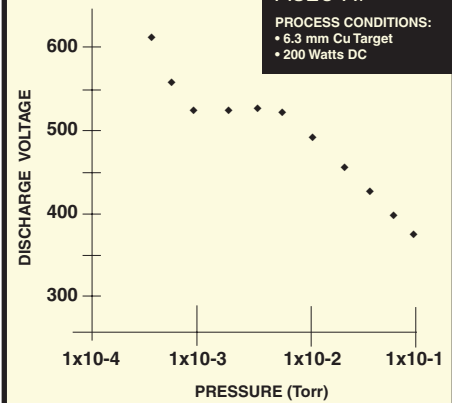
- 6.3 mm Cu Target
- 4 mT Argon
- 400 Watts DC
- 709 mA
- 564 Volts

- ◆ 50 mm Working Distance
- ⊗ 75 mm Working Distance
- * 100 mm Working Distance



A320-XP

PROCESS CONDITIONS:
• 6.3 mm Cu Target
• 200 Watts DC

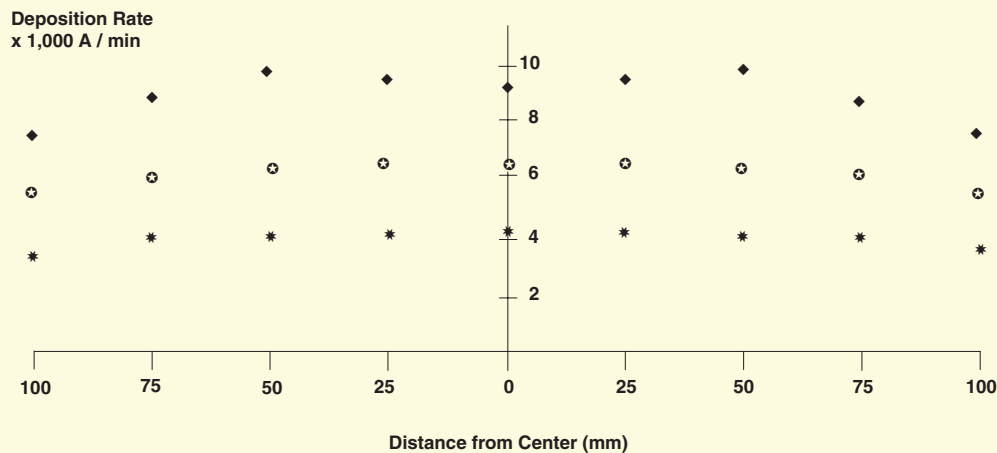


A380-XP

PROCESS CONDITIONS:

- 6.3 mm Cu Target
- 4 mT Argon
- 5000 Watts DC
- 10.4 A
- 480 Volts

- ◆ 50 mm Working Distance
- ⊗ 75 mm Working Distance
- * 100 mm Working Distance

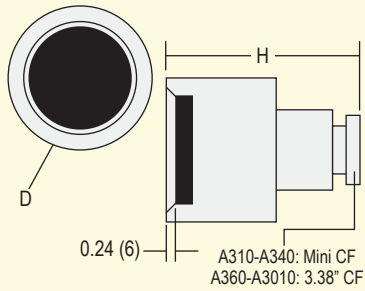


SPECIFICATIONS & DIMENSIONS

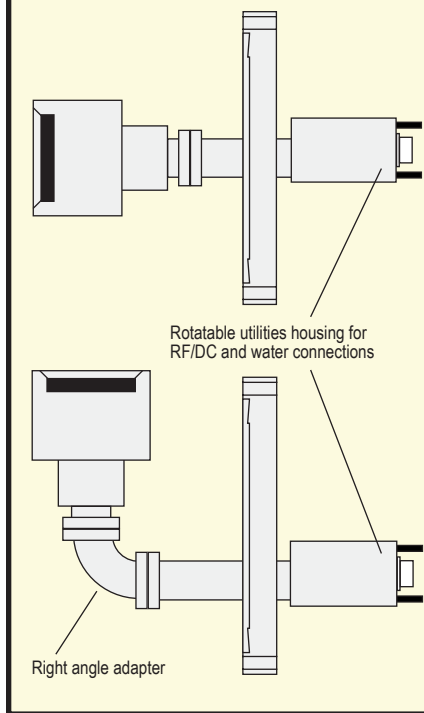
Specifications subject to change without notice.

* Sources configured for 0.250" (6.3 mm) thick targets unless specified in order.

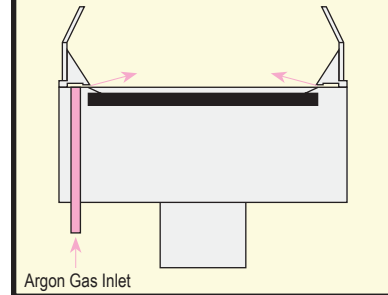
A310-XP SERIES SOURCE HEAD



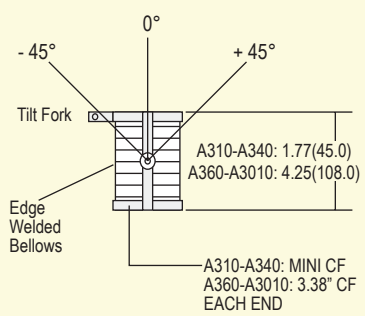
AXIAL & RIGHT ANGLE CF FLANGE MOUNTING



GAS INJECTION RING & SHIELDING CHIMNEY

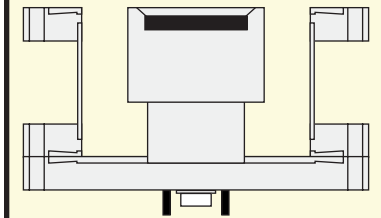


TILT GIMBALS

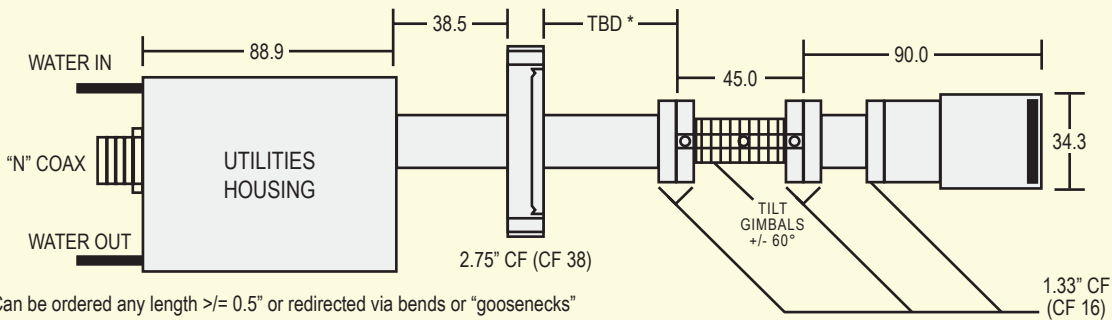


PORT EXTENSIONS W/ LOW PROFILE SRC HEAD

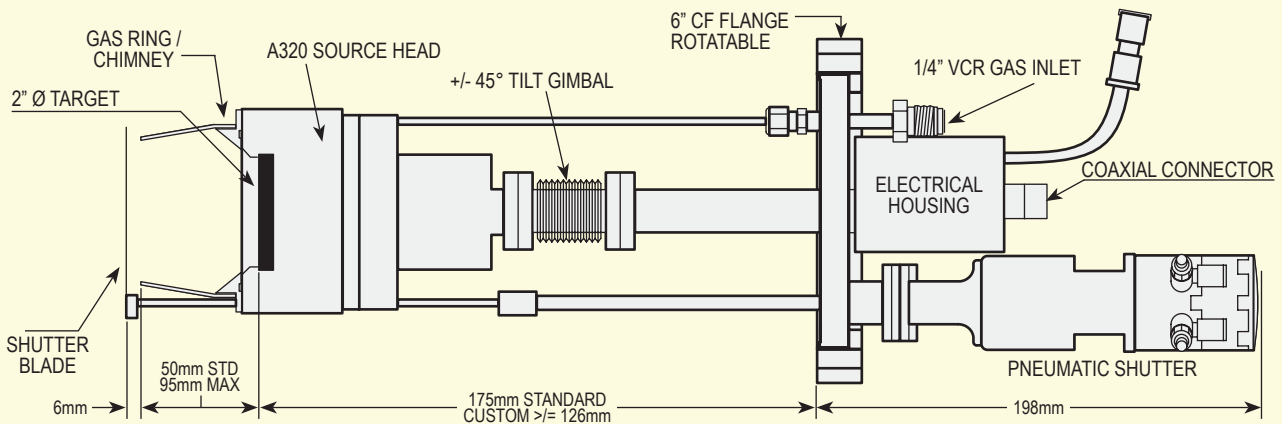
CF Flange nipple with Low Profile source head permits "flush mount" configuration.



A310-XP SPUTTERING SOURCE DIMENSIONS (mm)



A320-XP MAGNETRON SPUTTERING SOURCE WITH IN-SITU TILT



SPECIFICATIONS & DIMENSIONS

SOURCE HEAD CONFIGURATIONS

- MM (MAGNETIC MATERIAL)
- S (NON-STANDARD SPECIAL)
- HP - HIGH PRESSURE

TYPICAL MOUNTING OPTIONS *

- A (AXIAL)
 - R (RIGHT ANGLE)
 - LP (LOW PROFILE)
- (* custom versions available)

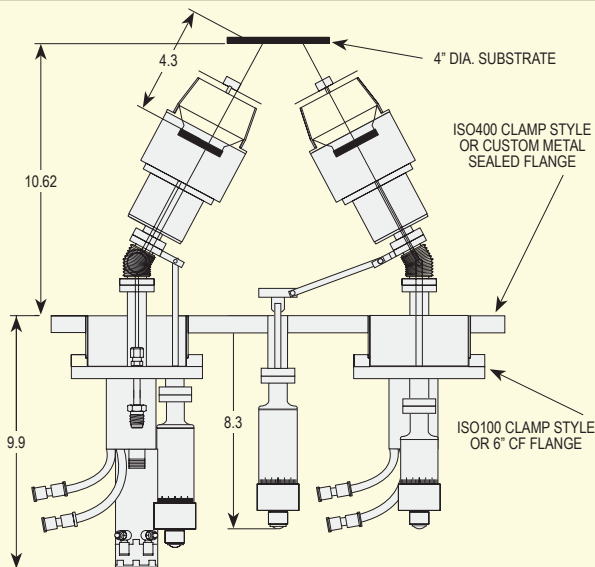
POPULAR OPTIONS

- CLAMPING RING ADAPTORS
- TILT GIMBALS / IN-SITU TILT
- SOURCE SHUTTERS
- GAS INJECTION RING W/ CHIMNEY

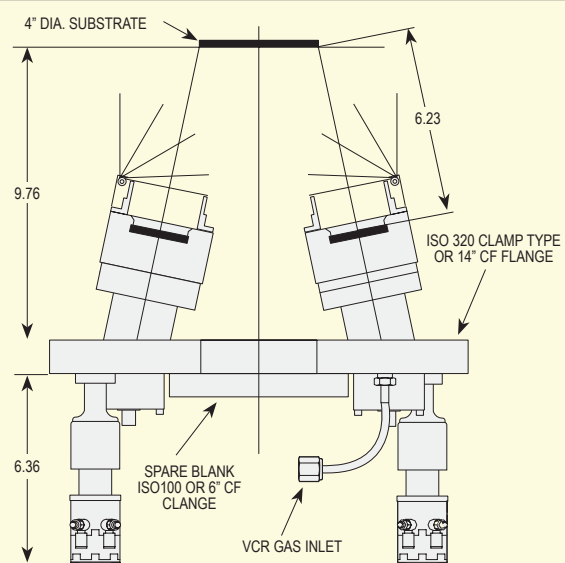
MODEL NUMBER	A310	A315	A320	A330	A340
TARGET DIAMETER / MAXIMUM THICKNESS [in (mm)]	1.0" / 0.125" (25.4 / 3.2)	1.5" / 0.125" (38.1 / 3.2)	2.0" / 0.375"* (50.8 / 9.5)*	3.0" / 0.375"* (76.2 / 9.5)*	4.0" / 0.375"* (101.6 / 9.5)*
MAXIMUM POWER - DC/RF (WATTS)	125/100	400/300	700/500	1200/800	1500 / 1000
COOLING WATER (liters/minute)	0.4	1.2	1.7	2.3	3.0
SOURCE HEAD DIAMETER (D) [in(mm)]	1.33" (34.3)	2.35" (59.7)	3.50" (88.9)	4.63" (117.6)	5.63" (43.0)
SOURCE HEAD HEIGHT (H) [(in (mm))]	2.00" (50.8)	4.70" (119.4)	4.80" (121.9)	4.80" (121.9)	4.80" (121.9)
MODEL NUMBER	A360	A380	A3010	A3CV	
TARGET DIAMETER / MAXIMUM THICKNESS [in (mm)]	6.0" / 0.375"* (152.4 / 9.5)*	8.0" / 0.375"* (203.2 / 9.5)*	10.0" / 0.375"* (254.0 / 9.5)*	2.0" - 3.0" / 0.250" (50.8 - 76.2 / 6.35)	
MAXIMUM POWER - DC/RF (WATTS)	4500 / 3500	6000 / 5000	7500 / 6000	500 / 500	
COOLING WATER (liters / minute)	5.0	7.3	10.0	3.0	
SOURCE HEAD DIAMETER (D) [in(mm)]	7.70" (195.6)	9.70" (246.4)	11.70" (297.2)	3.63" (92.1)	
SOURCE HEAD HEIGHT (H) [(in(mm))]	6.00" (152.4)	6.00" (152.4)	6.00" (152.4)	4.87" (124)	

UHV CLUSTER FLANGES

Tilted or fixed angle UHV cluster flanges available with wide range of source configurations and options.



Cluster of (4) A320-XP sources with gas ring chimneys. Source on left shown with individual in-situ tilt and pneumatic shutter. Source on right shown with "linked" in-situ-tilt and manual shutter. Recommended for substrates 4" diameter and smaller.



Cluster of (5) A320-XPO-O fixed angle sources with gas ring chimneys, pneumatic "flip top" shutters and spare port in the center for analysis, evaporation or an ion source. Recommended for substrates 4" diameter and smaller.

RF / DC POWER SUPPLIES



	POWER	MODEL
RF AUTOMATCHING: Networks feature one vacuum and one air capacitor for optimum reliability. Air cooling is standard on smaller units.	300 watt	A300RF / A300MU
	600 watt	A600RF / A300MU
	1000 watt	A1000RF / A1000
LOW POWER RF: Integrated PS / manual match box makes this package ideal for small sources	100 watt	A100 RF/ A100MM
	300 watt	A300RF / A300MM
PULSED DC: These modules / power supplies modulate the DC output to prevent arcing, increase rate or ionize the sputtered material.	20 kHz	ASPL-20
	Variable	ASPL-V
	HIPIMS	Sinex 2.0, 4.0, 8.0
DC POWER SUPPLIES: Supplies feature efficient switching technology, power / current / voltage regulation, arc supression, remote connector and interlocks.	500 watt	A500 DC
	1000 watt	A1000 DC
	1500 watt	A1500 DC
DCXS SERIES: Supplies are fully programmable with process storage and power ramping to reduce thermal stress on the targets.	750 watt	DCXS-750-3 / DCXS-750-5
	1500 watt	DCXS-1500-3 / DCXS-1500-5



SPUTTERING TARGETS & EVAPORATION MATERIALS



AJA International, Inc. offers a variety of sputtering targets to satisfy virtually any requirement. Targets available in a wide range of materials, sizes and purities. If you don't see the material options you are looking for please don't hesitate to call or email your requirements as custom projects are our specialty.

FABRICATION OPTIONS

- MACHINED
- HOT PRESSED
- VACUUM MELT
- STANDARD & CUSTOM BACKING PLATES
- PURITIES FROM 99.0% - 99.999%
- METALIC & EPOXY BONDING
- HIGH TEMP ELASTOMER BONDING

TYPES OF MATERIALS AVAILABLE

- OXIDES
- BORIDES
- NITRIDES
- SELENIDES
- FLOURIDES
- SILICIDES
- SULFIDES
- CARBIDES
- ALLOYS
- PURE METALS
- NON-METALS

PARTIAL LIST OF AVAILABLE MATERIALS & MATERIALS SOLD

Ag	99.99	In(2)O(3)	99.99	Si(3)N(4)	99.9 ex binder
Al	99.999	Ir	99.95	SiO	99.9
Al(2)O(3)	99.99	ITO	99.99	SiO(2)	99.995
Au	99.99	Mg	99.95	Sn	99.995
C	99.999	MgO	99.95 ex Ca	SnO(2)	99.9
Co	99.95	Ni	99.99	Ta	99.99
Co(2)Fe	99.9	Ni/Fe	99.95	Ti	99.999
Cr	99.95	Pd	99.95	TiO(2)	99.5
Cu	99.995	Pt	99.95	V	99.7
Fe	99.95	Re	99.95	W	99.95
Ge	99.999	Ru	99.95	ZnO	99.995
In	99.995	Si	99.999	ZnO/SnO(2)	99.99

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