

# ■ ■ ■ Gridless end-Hall ■ ■ ■ Ion Sources

*For Ion Assisted Thin Film  
Deposition & Substrate Cleaning*



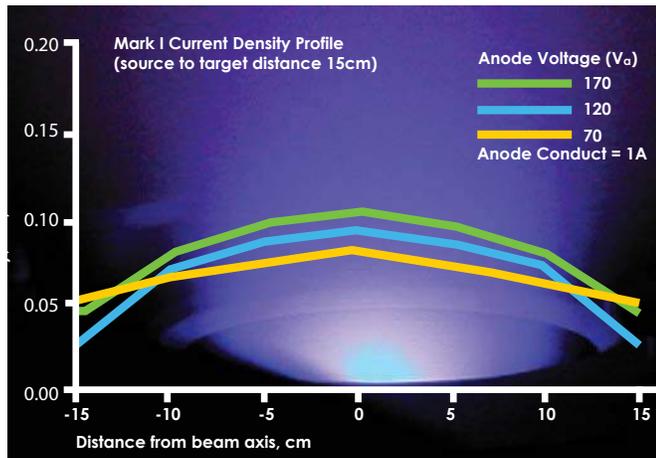
# END-HALL ION SOURCES

## MARK I ION SOURCE

The Mark I End-Hall is ideal for small research and development and pilot production e-beam coating systems.

### FEATURES

- Reactive gas compatible
- Low contamination
- Rugged and reliable
- Ideal for small systems



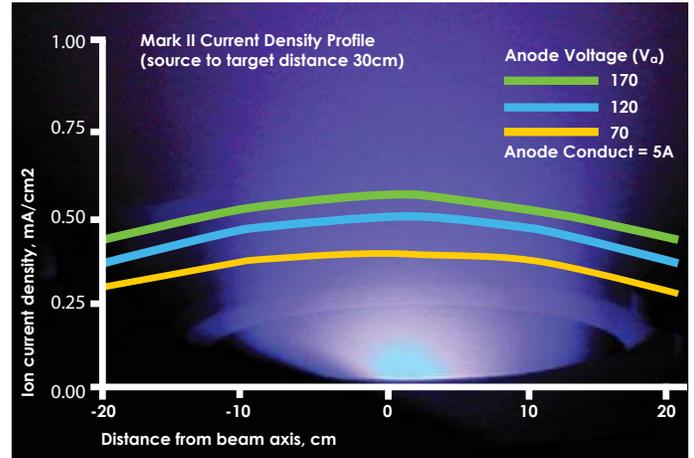
DEVICE/PROCESS	MATERIALS
Source dimensions: (dia. x length)	6.4 cm x 11.4 cm
Chamber size:	up to 60 cm
Throw distance: (source-to-substrate)	up to 30 cm
Ion energy:	50-170 eV
Beam current:	up to 200 mA
Operating pressure:	$<3 \times 10^{-4}$ Torr
Magnet:	High-Curie point permanent
Cathode/neutralizer:	Immersed filament or HCES
Gas requirements:	3-10 sccm

## MARK II ION SOURCE

The Mark II is the industry standard source for optical coating systems and is the most widely used ion assist source.

### FEATURES

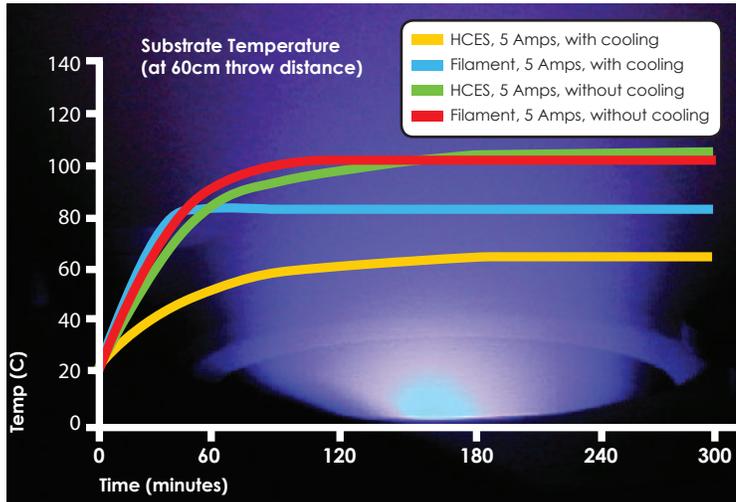
- Production proven design
- Reactive gas compatible
- Low contamination
- Numerous options available



DEVICE/PROCESS	MATERIALS
Source dimensions: (dia. x length)	14 cm x 19 cm
Chamber size:	60-150 cm
Throw distance: (source-to-substrate)	30-90 cm
Ion energy:	60-170 eV
Beam current:	up to 1000 mA
Operating pressure:	$<3 \times 10^{-4}$ Torr
Magnet:	High-Curie point permanent
Cathode/neutralizer:	Immersed filament or HCES
Gas requirements:	10-50 sccm

# WATER-COOLED MARK II ION SOURCE

The Water-Cooled Mark II Ion Source adds efficient cooling for processes requiring low temperatures and reduced cycle times. Engineered and tested to withstand rigorous production environments, the Water-Cooled Mark II has a distinctive anode design which promotes excellent heat transfer out of the vacuum chamber and away from substrates.



## WATER-COOLED FEATURES & BENEFITS

- Dramatically reduced substrate temperatures
- Elimination of cool-down prior to venting
- Greater ion beam stability/control

## RESULTS

- Reduced stress
- Increased production throughput
- Reproducible film properties

## MARK II - HCES

The Mark II ion source is configured with a Hollow Cathode Electron Source (HCES) to permit long run times with reactive gases while maintaining consistent and reliable operation. Ideal for oxygen and other long reactive processes, the HCES provides sufficient electron emission for ionization and beam neutralization. When combined with the Water-cooled anode, the Mark II-HCES provides the coolest operation of the Mark II Series.

## BENEFITS

- Filamentless operation
- Reduced contamination
- Cool source operation



# END-HALL ION SOURCES

## GRIDLESS ION SOURCE POWER SUPPLIES

### Reverse compatible

- Remote I/O is pin to pin compatible
- Faster operation & response
- Digital & Switching technology
- Quick start (learn)
- More stable operation

- Dual regulation
- More reliable
- Low stored energy & output limits
- Longer filament lifetime
- Filament soft-start
- Triple filament lifetime option

### Mark I & Mark II Power Supply



## END-HALL ION SOURCE POWER PACK CONTROLLER:

	FILAMENT VERSION	HOLLOW CATHODE VERSION
<b>PRODUCTS:</b>	Mark I and Mark II	Mark I, Mark II, Mark II HO, Mark III
• <b>FILAMENT</b>	7A emission current Soft Start	10A emission current Soft Start
• <b>DISCHARGE</b>	1A or 5A & 170V DC Standard and low voltages	10A or 5A & 300V DC Standard and low voltages
• <b>AUTOCONTROLLER</b>	System Control Gas Control - 4 MFCs Open or closed gas loop control Automatic Start/Stop Sequence	“Autopilot” System Control Gas Control - 4 MFCs Open or closed gas loop control Automatic Start/Stop Sequence
<b>REMOTE INTERFACE:</b>	Isolated analog & RS-232	Isolated analog & RS-232
<b>INTERCHANGABLE:</b>	Mark I & Mark II reverse compatible	Mark I & Mark II reverse compatible
<b>SIZE:</b>	19” rack mount, 3U (13.3cm)	19” rack mount, 3U (13.3cm)

## MARK II WATER-COOLING RETRO-FIT KIT

### BENEFITS OF A WATER-COOLED ANODE

#### *Promote amorphous/crystalline growth*

- Near bulk indices

#### *Increased packing density*

- Eliminates water absorption
- Low spectral shift
- Hard, environmentally durable coatings

#### *Improved Step Coverage*

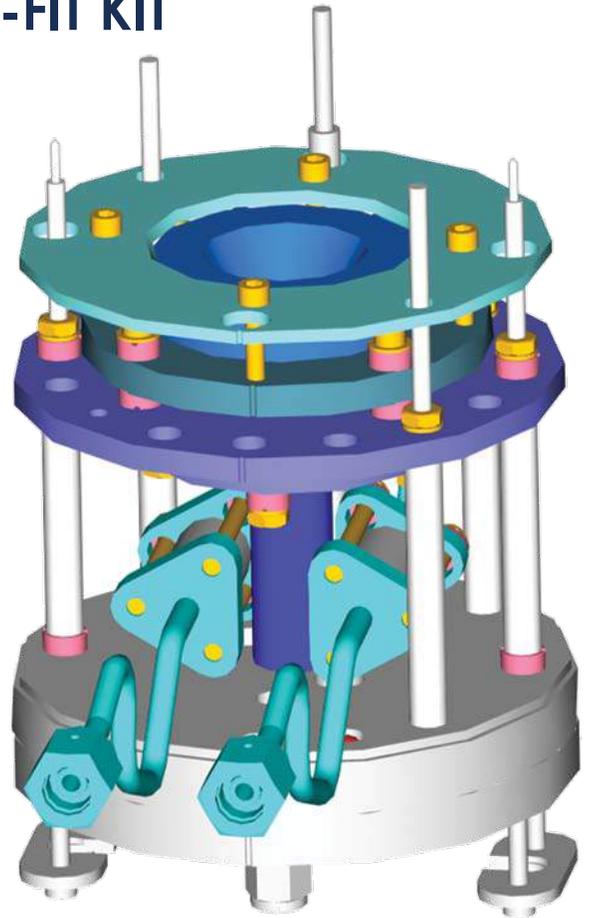
- Preferred grain sizes and boundaries
- Minimizes scatter and absorption

#### *Improved Adhesion*

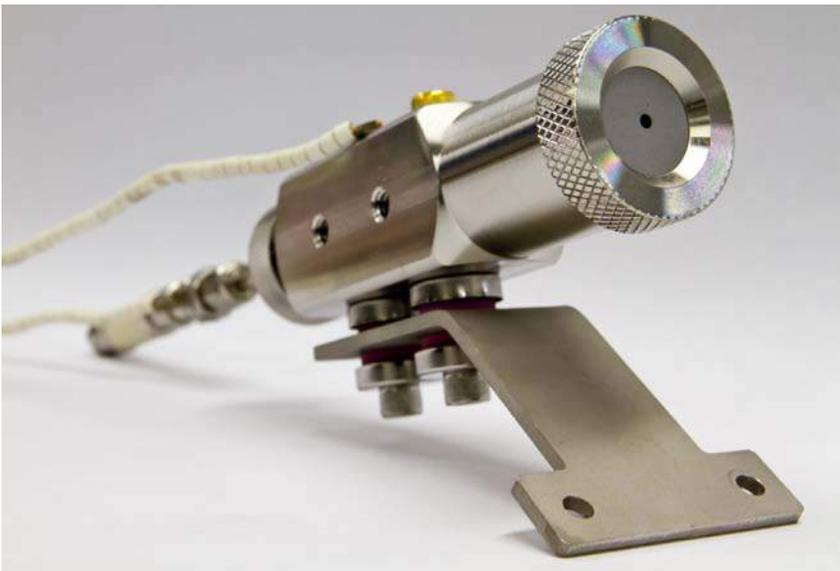
- Films adhere to substrates and each other

#### *Control Stoichiometry*

- Predictable and reproducible films



## HOLLOW CATHODE ELECTRON SOURCE RETRO-FIT KIT



Used instead of a tungsten filament, the Hollow Cathode Electron Source (HCES) ensures a contamination free environment and reduces maintenance intervals.

Intlvac's new Hollow Cathode Tip can run for over 150 hours before replacement.

Our retro-fit kits come complete with everything you need to make the switch.

# END-HALL ION SOURCES

## CONVENIENT ONLINE SHOPPING

Intlvac THIN FILM

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**PRODUCTS**

**VACUUM SYSTEMS:**

**THIN FILM SERVICES**

**ION BEAM SOURCE PARTS & SYSTEM ACCESSORIES**

- Mark I
- Mark II
- HCES 5000
- Gold Plated Hardware
- Gas Fitting Products
- Insulators
- Grided Sources & Commonwealth System Parts
- Replacement Ion Source Power Supply
- Thermal Management
- CSC Stage Platens
- Anodes
- Miscellaneous Parts

**THIN FILM SYSTEM PARTS AND ACCESSORIES**

**MARK II**

**MARK II ION SOURCE**  
 Intlvac Number: 29868  
 Supplier Number: 29868  
 Your choice of anode and gas distributor  
 Please contact Intlvac for price.  
 \$6,000 (USD)

**WATER-COOLED MARK II ION SOURCE**  
 Intlvac Number: 4000  
 Supplier Number: 4000  
 Your choice of anode and gas distributor  
 Please contact Intlvac for price.  
 \$6,000 (USD)

**MARK II ION SOURCE WITH HCES 5000 V COOLING**  
 Intlvac Number: 4000-HCS5000  
 Supplier Number: 4000-HCS5000  
 Please contact Intlvac for price.  
 \$6,000 (USD)

**CATHODE FILAMENT**  
 Intlvac Number: B27073  
 Supplier Number: A16982  
 Package of 10.  
 \$59.00 (USD)

**GRAPHITE GAS DISTRIBUTOR**  
 Intlvac Number: C27042-1  
 Supplier Number: B16921-1  
 \$278.00 (USD)

**UPCOMING EVENTS**

**SEM FACTOR'S WEST**  
 February 2, 2012 to February 7, 2012 at 12:00pm  
 San Francisco, California, The Moscone Center  
<http://www.semiconductors.com>  
 Come and see us at booth #112. Intlvac will be displaying a selection of high quality optical films, APC and containers.

- Every part stock
- Next day shipping
- Easy credit card checkout
- Fast, friendly, customer support

**MARK I ION SOURCE**  
 SHEET 2 OF 3

**MARK I ION SOURCE**  
 SHEET 1 OF 3

56	B5287-7	NUT, HEX, 10-32, AU	2
55	8524H-S	SCREW, MACHINE, 10-32 X 3/16, CAP HEAD	2
55	8524H-S	SCREW, MACHINE, 10-32 X 1/4, HEX HEAD	1
52	0-PL	WASHER, FLAT, NO. 10	16
51	1024-H	NUT, HEX, 10-32	15
50	C2901-10	SET SCREW, #10 X 1/8, AU	2
29	B2907-2	STAINLESS STEEL WASH	2
28	A4200	BULKY CLAMPING BELL, 1/8" O.D.	1
25	10-32H	MALE INSULATOR, NO. 10	1
20	A4988	OUTER SHELL	1
18	A4074L	CATHODE FILAMENT	1
17	C2902	INSULANT	1
16	C2908	FILE ROD	1
15	C2910	ANODE CONNECTOR	1
14	C2912L	CATHODE CONNECTOR	1
13	C2913	CATHODE SUPPORT	1
12	C2912	HOLD DOWN ANODE	1
11	C2912	HOLD DOWN ROD	1
10	A426A	PHI SOCKET ASSEMBLY	1
8	C2916	PLUG	1
8	C2918	MANIFOLD	1
7	C2917	SUPPORT PLATE	1
6	C2916-1	GAS DISTRIBUTOR	1
6	C2916-5	GRAPHITE	1
6	C2916-5	STAINLESS STEEL	1
6	C2916-5	TITANIUM	1
6	B8009-1AC	GRAPHITE WITH CERAMIC GRACERS	1
6	B8009-2AC	STAINLESS STEEL WITH CERAMIC GRACERS	1
6	B8009-3AC	TITANIUM WITH CERAMIC GRACERS	1
5	C2914L	WORK STATION	1
4	C2916	BACK ANODE SUPPORT	1
3	C2916-X	ANODE - GRAPHITE - 2" STAINLESS STEEL	1
1	C2916	FRONT ANODE SUPPORT	1
1	C2916	SECTION 1	1

**SECTION A-A**  
 1" FROM ALIGNMENT GROOVE

**SECTION B-B**  
 1/8" CW FROM ALIGNMENT GROOVE

**SECTION C-C**  
 90° CW B/O 170° CW FROM ALIGNMENT GROOVE

**SECTION D-D**  
 180° CW AND 540° CW FROM ALIGNMENT GROOVE

Intlvac THIN FILM

Greg Dawn  
 gdawn@intlvac.com  
 www.intlvac.com

INTLVAC THIN FILM manufactures and has IN STOCK every part for the Mark I and Mark II ion sources at our NY facility. Orders are shipped the same day and there is always someone available to answer any of your questions.

Our website, [www.intlvac.com](http://www.intlvac.com), has a price and picture of every part. Plus we have complete assembly drawings of the Mark I and Mark II ion source to help you determine what parts you require.

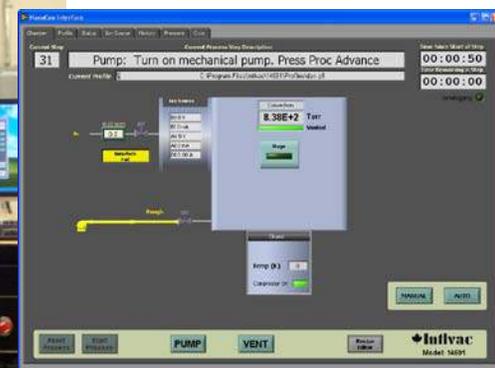
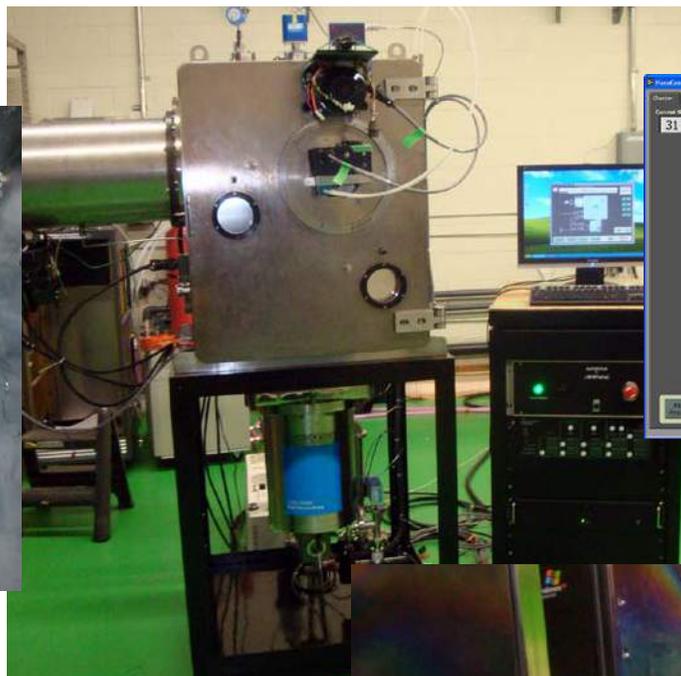
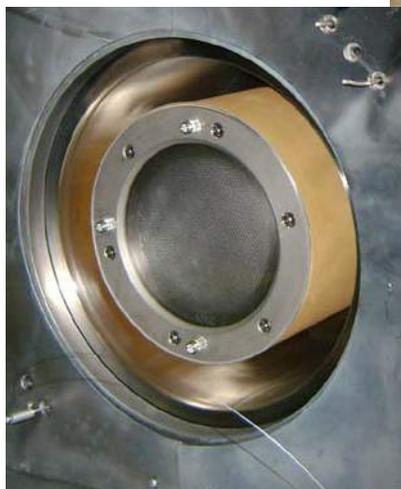
[www.intlvac.com/ion](http://www.intlvac.com/ion)

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# REFURBISH & RETROFIT

## COMMONWEALTH SCIENTIFIC & VEECO ION TECH

Upgrade your old Commonwealth Scientific or Veeco Ion Tech system to a state of the art ion source and modern control system utilizing a LabVIEW interface and datalogging of your process. Substrate stages can also be refurbished with new parts made to the original specifications



## MARK I AND MARK II SOURCES

Intlvac provides full service refurbishing of Mark I and Mark II ion sources using parts made to the original specifications .

# PROVIDING LEADING-EDGE TECHNOLOGY SOLUTIONS

Intlvac Thin Film has a long-standing commitment to quality and excellence in the optical coating industry. Our goal is to deliver value-added solutions that exceed expectations. Research and development play a major role in our technology's edge in the market.

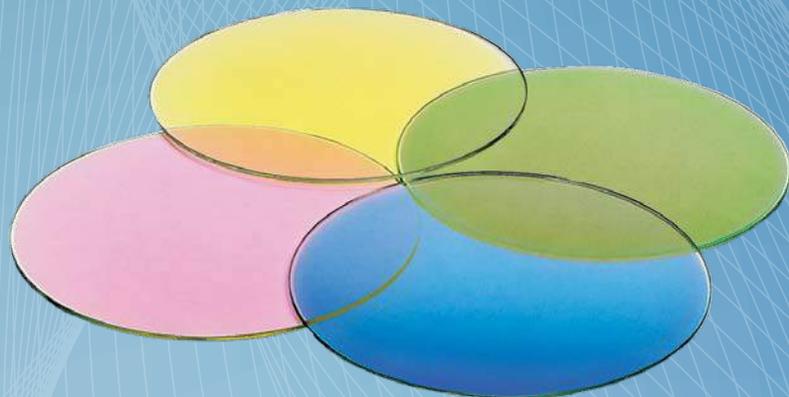
Our in-house development lab designs, engineers and manufactures the systems we use for thin film coatings.



## THIN FILM COATING DEVELOPMENT SERVICE

Intlvac Thin Film has taken advantage of decades of experience in designing and building thin film coating tools. We have our own in-house systems for processes such as E-beam, Thermal Evaporation, and Reactive Sputtering.

We can provide coating services from R&D to pilot production quantities. Our in-house tools include a NC-IV P.A.R.M.S. for development and evaluation.



## THIN FILM PVD AND ETCH SERVICES

At Intlvac Thin Film, we design and manufacture a wide variety of systems for Thin Film PVD and Etch. Our product line ranges from small R&D/pilot project systems to large production systems utilizing processes such as Ion Beam Etching, Sputtering, E-beam and Thermal Evaporation fiber-optic coating and more!

800.959.5517 • [intlvac.com](http://intlvac.com)