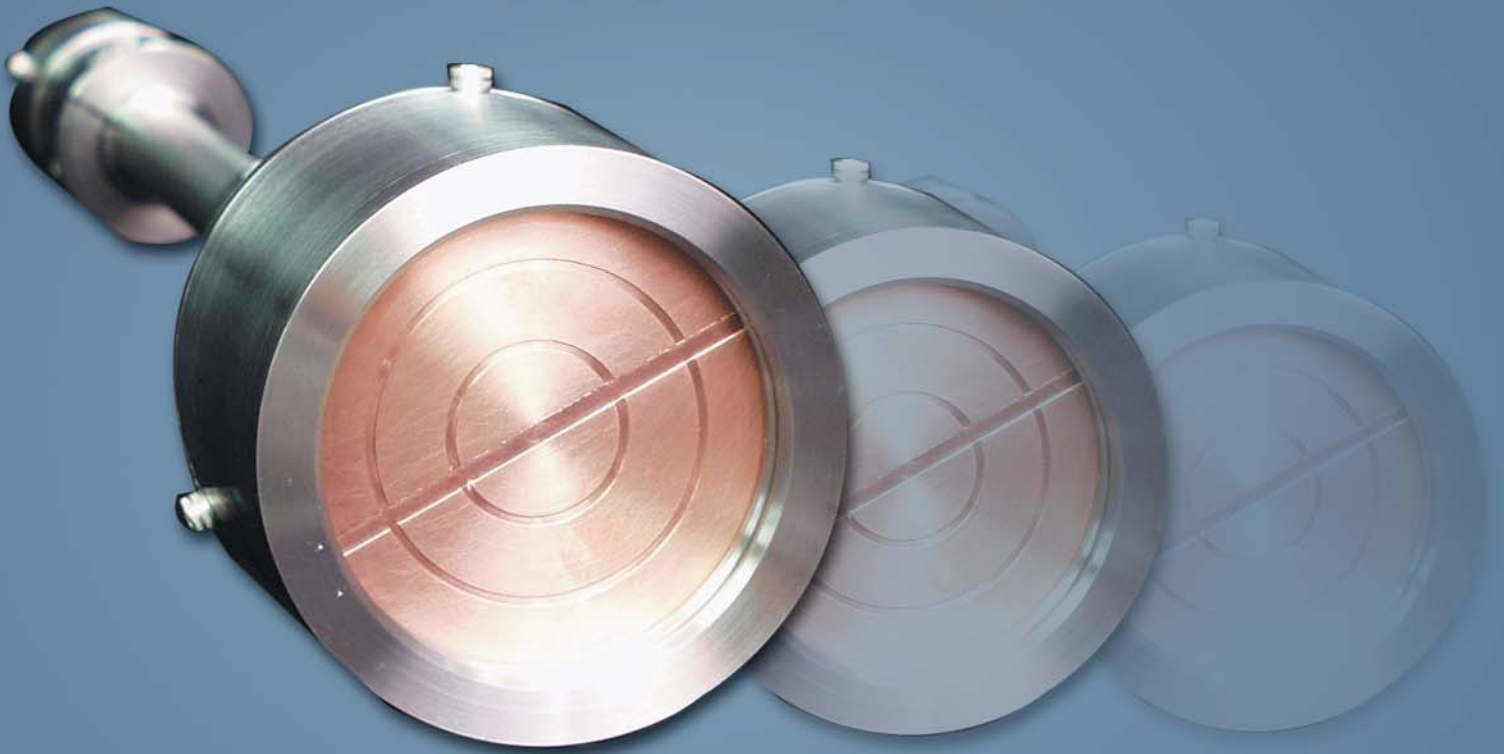


# TORUS<sup>®</sup>

Magnetron Sputtering Sources

VHV (very high vacuum) 1"-4" Diameter



## Versatility

- RF, DC, pulsed DC operation
- Magnetic targets
- Balanced or unbalanced operation
- Convertible target diameter
- Axial, right angle, flex ( $\pm 45^\circ$ ), and custom mounts

## Performance

- Low outgassing, VHV compatible ( $\sim 3 \times 10^{-9}$  Torr)
- Unmatched uniformity, excellent rates
- Efficient target utilization
- Operate over a wide pressure range
- No special target requirements (no need for thermal pastes, target keepers, etc)

## Design

- Modular magnet array
- Compact, VHV compatible construction ( $\sim 3 \times 10^{-9}$  Torr)
- Magnets NOT exposed to cooling water
- Magnets NOT exposed to vacuum
- Numerous accessories (gas injection, chimneys, shutters, cluster arrays)
- Custom arrangements

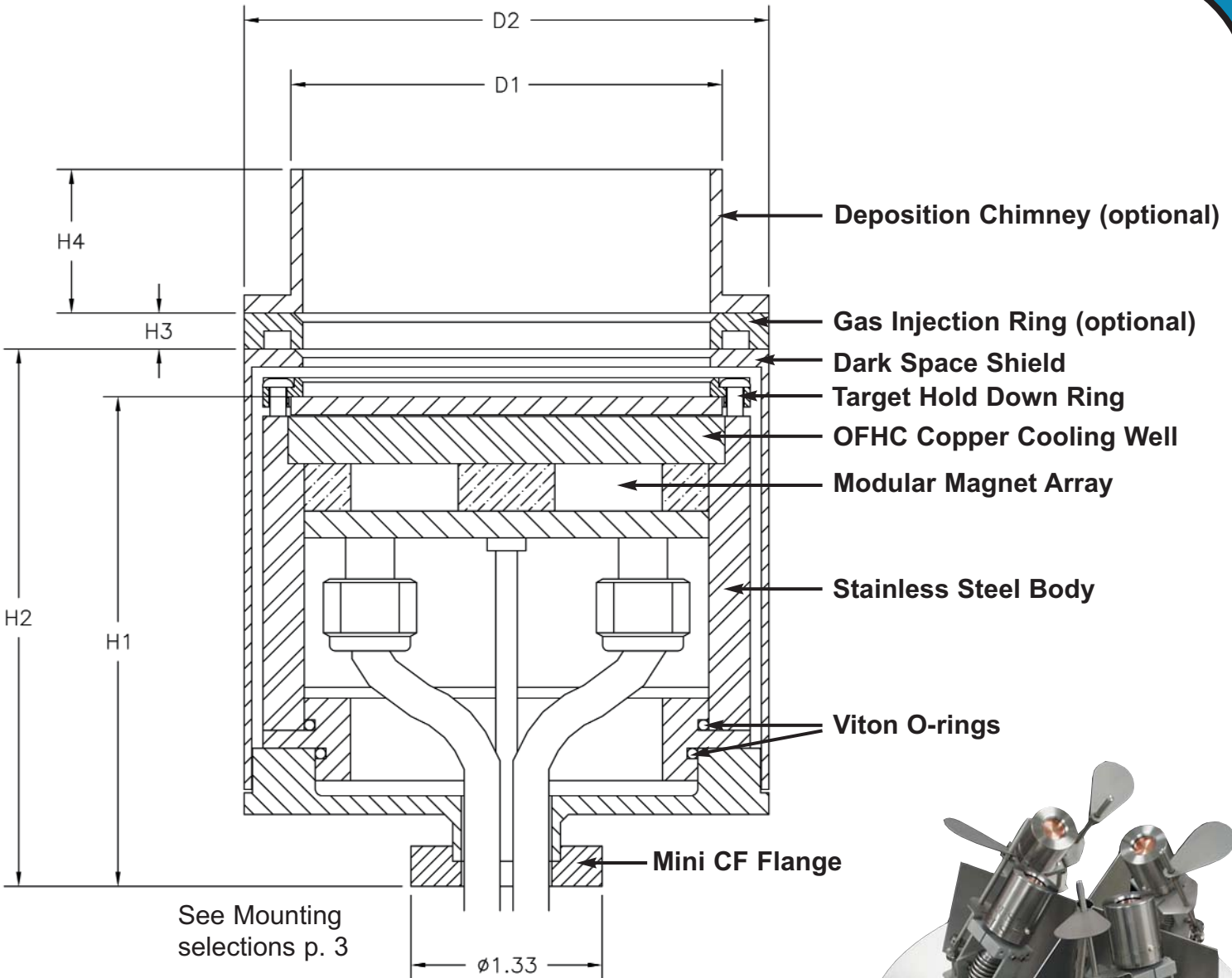
**Kurt J. Lesker**  
Company

[pvd@lesker.com](mailto:pvd@lesker.com)

1.800.245.1656

[www.lesker.com](http://www.lesker.com)

# TORUS® 1"-4" SPUTTER SOURCES



*Torus 1" Cluster Assembly (shown with flex mounting and pneumatic shutters).*

*Torus® is a registered trademark of the Kurt J. Lesker Company.*

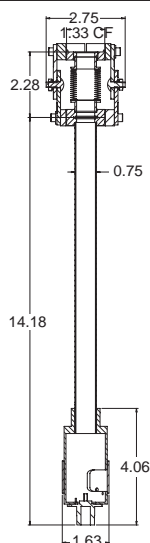
## TORUS Dimensional Information

MODEL	TM01	TM02	TM03	TM04
H1 = Flange to Target	2.88" 73mm	3.41" 87mm	3.41" 87mm	3.66" 93mm
H2 = Flange to Dark Space Shield	3.10" 79mm	3.80" 97mm	3.80" 97mm	3.99" 102mm
H3 = Gas Ring	N/A	0.25" 6.4mm	0.25" 6.4mm	0.25" 6.4mm
H4 = Chimney	N/A	1.00" 25.4mm	1.00" 25.4mm	1.00" 25.4mm
D1 = Chimney OD	N/A	3.00" 76mm	3.00" 76mm	4.00" 102mm
D2 = Cathode OD	2.02" 52mm	3.65" 93mm	3.65" 93mm	4.65" 118mm

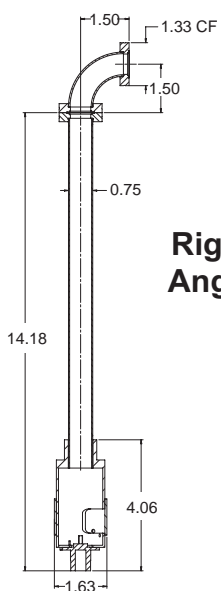
# TORUS® 1"-4" SPUTTER SOURCES

## Mounting Selections

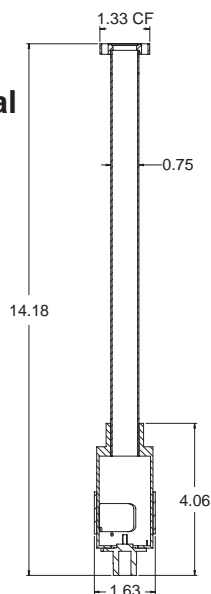
Flex



Right Angle



Axial



## Configurations

	TM01	TM02	TM03	TM04
Target diameter	1" (25.4mm)	2" (51mm)	3" (76mm)	4" (102mm)
Target thickness	0.063-1/8" (1.6-3.2mm)	0.080-1/4" (2-6.3mm)	0.080-1/4" (2-6.3mm)	0.080-1/4" (2-6.3mm)
Power Connector	N type - Male	N type - Male	N type - Male	N type - Male
Cooling	Indirect	Indirect	Indirect	Indirect
Axial Mount (0.75"OD tube)	Standard	Standard	Standard	Standard

## Accessories

Flex Option ( $\pm 45^\circ$ )	TM00CC-00940	TM00CC-00940	TM00CC-00940	TM00CC-00940
Right Angle Option	TM00CC-00930	TM00CC-00930	TM00CC-00930	TM00CC-00930
Deposition Chimney Option	N/A	TM03CC-00421	TM03CC-00421	TM04CC-00421
Gas Ring	N/A	TM03CC-00431	TM03CC-00431	TM04CC-00431
Magnetic Materials	N/A	Call for details	TM03CC-HS300	TM04CC-HS300
Convertible Target Size	N/A	TM00CC-23KIT	TM00CC-32KIT	N/A

## Operation

Balanced	Standard	Standard	Standard	Standard
Unbalanced	Many configurations available -- Call for details.			

## TORUS Part Numbering Configuration

TM	nn	a	b	mm	c	d	e
Torus Magnetron	Size	Mounting Style	Magnet Array	Tube Length	Flange Size	Gas Injection	Shutter
TM	01 02 03 04	A = axial F = flex R = right angle S = special	S = standard M = magnetic	10 = 10" *Lengths to order	6 = 6" CF 8 = 8" CF 10 = 10" CF X = none	G = gas ring C = chimney B = both X = none	M = manual P = pneumatic F = flip S = swing X = none

Ex. TM 02 F M 10 8 X S Torus Magnetron, 2", Flex Mounted, Magnetic Array, 10" Tube, 8" CF Flange, No Gas Injection, Swing Shutter



\* Many mounting configurations are available (including custom fabrications)—call for details.

\* Numerous cluster assemblies are available—call for details.

## Deposition Performance

Typical Uniformity (%) (Static, 2mT, 250W)				
Substrate Diameter	Throw Distance	TM02 2" source	TM03 3" source	TM04 4" source
50mm	50mm	8.1	6.3	-
50mm	100mm	3.6	3.2	-
50mm	150mm	2.3	2.1	-
100mm	100mm	9.4	6.7	5.8
100mm	150mm	5.4	4.4	2.7
150mm	50mm	-	-	4.1
150mm	100mm	-	10.2	3.4
150mm	150mm	-	6.4	5.4

Typical Deposition Rate Torus® 1, 2, 3, and 4 (Static, 5mT in Angstroms-Watt/Second X 100)			
Throw Distance	Al	Al <sub>2</sub> O <sub>3</sub>	Fe*
50mm	8.5	0.9	7.1
100mm	3.2	0.4	2.8
150mm	1.5	0.2	1.4

\*Call for details when using TM01 and TM02 with magnetic materials

Film uniformity and deposition rate are impacted by several factors including, but not limited to: system geometry, substrate make-up, power, pressure, etc. The above information is provided for reference only. Please contact us for specific performance data.

### Optimized Uniformity

Vast improvements in deposition uniformity can be achieved with substrate rotation, substrate positioning, and by using certain process parameters. Uniformity of better than 2% on a 6" diameter substrate is not uncommon. Please contact us for more details.

### The Kurt J. Lesker Company Supplies a Wide Range of Related Products, Including:

- Additional magnetron sources including: industrial sources, linear sources, and true UHV sources
- Other deposition sources including: electron beam, thermal evaporation, OLED evaporation, Linear OLED
- Full range of targets and materials
- Power supplies
- Gas introduction and pressure management
- Standard system "building blocks" including; chambers, hoists, load locks, heater assemblies, and auto control systems
- Complete, turn-key deposition systems

