

IES Update

Ideas to Consider ...

Process Exhaust Build-up Problems?

If your process creates an effluent stream that causes excess build-up in your pumps, exhaust piping, and/or exhaust scrubbers, here are some suggestions you may wish to consider:

- Install an isolation valve upstream of your roughing pump. This enables you to keep your pump running while performing maintenance on your chamber, to avoid build-up in the pump that prevents it from restarting. Talk to us about A&N vacuum valves.
- Install closed loop controlled, flexible, modular heaters on your forelines and exhaust lines to keep them above the gas condensation point for your process – usually between 85C and 120C, up to 200C. We can supply the individual components, or handle everything from design to installation. Talk to us about *IES Thermal Solutions*.
- Consider an exhaust trap. We can help you specify the best type for your process.

Gas Flow Management Issues?

Ever wonder why you need to frequently adjust your high pressure single stage regulator to maintain a certain outlet pressure? The cause is “Supply Pressure Effect,” which is commonly between 0.5 and 1.0 PSI per 100 PSI of inlet pressure decay. Thus a single stage regulator on a 3000 PSI bottle, set at 30 PSI outlet, will show a rise in outlet pressure to 35 to 40 PSI by the time the bottle pressure drops to 2000 PSI. We suggest using a two-stage regulator with a Supply Pressure Effect of only 0.05 to 0.1 PSI per 100 PSI of decay, such as the *Veriflo 735 Series* or *IR6000 Series*.

Another common issue is low flow instability. This can be caused by a number of things including a faulty MFC; but if you are using a high pressure bottle and trying to flow less than 100 sccm, replacing your single stage regulator with a two stage often solves this problem as well.

Last but not least is safety: if you are using a hazardous gas, specify a “tied-diaphragm” style regulator. The diaphragm is attached to the poppet, thus preventing a runaway flow in the event of a leak or blockage where the poppet is sealed.

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Value Added by IES

Our primary job is to make your job easier. Contact us if we may help you with:

Vacuum Hardware Procurement:

Your time is valuable. Tell us what you need for vacuum hardware such as KF/NW/QF and CF flanges, clamps, elbows, tees, etc., using part numbers or descriptions, and when you need delivery. We will do the legwork for you including searching multiple locations if needed, and come back quickly with a quote.

Gas Handling Components:

Need a regulator or a valve, quickly? We already stock many common *Veriflo* parts; but if we do not have what you need in our stock, we are part of a nation-wide network of *Veriflo* distributors that share inventory information. Tell us what you need and we will come back with all available choices to fit your application.

Component Stocking Services:

IES stocks and distributes for:

- *DuPont Performance Elastomers (Kalrez)*
- *Teledyne Hastings Instruments*
- *Telemark (e-beam components/materials)*
- *Veriflo Division of Parker*
- *Watlow*

We will stock your key parts for **Just In Time** requirements. Tell us what your needs are and we will design a program to fit.

Thermal Solutions:

If you have to measure or control temperature, for virtually any application, we can help. Call our in-house Thermal Expert, Dave Safford.

PVD Consulting:

Are you considering acquiring or upgrading an evaporation or sputtering system? Do you need help deciding what process to use, developing a system specification, or selecting the right system provider? Call our in-house PVD Process Expert, Tony DeChristoforo.

Recent Product Additions:

PVA TePla

IES is pleased to announce the addition of *PVA TePla*, recently named #2 on the VLSI list of best chip making equipment companies. TePla designs and manufactures:

- Microwave Plasma Etching and Cleaning Systems for wafers up to 300mm. Microwave offers many benefits including low damage rate and the ability to etch SU8 photoresist.
- Asyntis Plasma Based Wafer Thinning Systems for removing stress. A great alternative to CMP.
- SIRD (Scanning InfraRed Depolarization) Metrology Systems for stress measurement on monitor or product wafers.
- TWIN (Thermal Wave INspection) Metrology Systems for absolute ion implant dose monitoring from 1E11 to 5E16. If your current thermal wave system is not meeting your needs, call us for more information.

www.pvateplaamerica.com

PE Ceramics

If you are currently buying high purity ceramics from your OEM tool provider, you are spending much more than you need to for high quality parts. *Precision Engineered Ceramics* of Austin, TX, specializes in second source manufacturing of ceramic parts for the most popular semiconductor thin film process tools including LAM®, Novellus® and Applied Materials®. Some common examples include hot edge rings, guard rings, injectors, ESC focus rings, robot paddles, lift pins, RF shaped windows.

Also offered by *PE Ceramics*:

- a wide variety of non-ceramic parts for Novellus Concept One tools
- CMP ring refurbishment service

www.peceramics.com

Sputtering with *Advanced Energy*

There are a variety of ways to approach sputtering. Along with *Advanced Energy* (AE), the #1 supplier of sputtering power supplies, we will help you determine the best method to use.

First things first: we suggest you subscribe to AE's free "Sputter Spotlight" newsletters. Visit this link: http://www.advanced-energy.com/en/Sputter_Spotlight.html. These newsletters are full of helpful information, Q&A, and reference materials.

As an overview, here are some basic guidelines regarding the various approaches to sputtering, pertaining to power supply choices:

- 1) Straight DC: lowest cost and complexity, highest sputter rate, but lowest film quality. Recommended for basic conductive film applications.
- 2) AC: very good overall quality and film performance for conductive films; particularly good choice for new in-line industrial coating systems.
- 3) Pulsed DC: similar results to AC but a better choice for batch systems.
- 4) Straight DC with 13.56 MHz RF: excellent sputter rate and film quality approaching semiconductor grade, but more complex and expensive and requires an RF blocking filter to protect the DC supply.
- 5) 2 MHz RF: Good choice for strong dielectric materials such as alumina (Al^x).
- 6) Straight 13.56 MHz RF: if film quality is your primary concern and you can tolerate a low (20%) sputter rate, this is the way to go.

Thinking about a retrofit?

- If your system has AC now and it is working well, stick with AC.
- If your system has DC and only one cathode, switch to pulsed DC (look at Pinnacle Plus+ Series)
- If your system has DC and you are able to add a cathode, consider switching to AC.

Questions on sputtering? Call us.

Magnetron Sputtering Cathodes from *Genco*

It's easy to make claims of "highest utilization" and "best uniformity." Genco backs it up with extensive computer modeling to determine the optimum magnetic circuit design, and has field results to prove performance. A standard Genco cathode will perform as well as other so-called "high performance option" products. Genco offers various magnetic options: High Yield, Super High Strength, Full Face Erosion, Thick magnetic materials (LOOP), and Customized High Uniformity. And if you are doing reactive sputtering, talk to us about the Speedflo™ Reactive Process Control system.

www.genco.com

If you need a Surface Profiler, think *DEKTAK*

If you need more accurate measurement data on your deposited films, talk to us about the Dektak Series from *Veeco Metrology*. Dektaks provide accurate measurements over long scan lengths, with step heights up to 1mm. Dektaks can be used for step heights, roughness, waviness, flatness, bow and stress. There are two Dektak platforms:

D150 – R&D profiler for substrates up to 6" (*IES has a full time demo unit in Danvers*)

D8 - Programmable profiler for substrates up to 8"

	D150	D8
Stage Size	6.5"	8"
Scan Length	≤ 30 mm	≤ 100 mm
Stylus Force	1-15 mg	.03-15 mg
Force Adjstmnt.	Programmable	Programmable
Max Data Points	8,000	30,000
Max Vert Range	262 or 1000μ	262 or 1,000μ
Vertical Data Resolution	1 A max	1 A max
Step Height Repeatability	10 A, 1σ	7.5 A, 1σ

Focus on Kalrez®

DuPont Performance Elastomers	Years in business: 30+
300 Bellevue Parkway Suite 300	Employees: 300+
Wilmington, DE 19809	
http://www.dupontdow.com/Products/Kalrez/kalrez.asp	Products: Kalrez® perfluoroelastomer o-rings, gaskets, bonded doors, and custom parts

DuPont Performance Elastomers (DPE), formerly DuPont Dow Elastomers, has spearheaded the high performance perfluoroelastomer market since the 1970s. If you are working with aggressive plasma or high temperature, please talk to us about Kalrez®. We will help you select the best compound for your process. IES Technical Sales is your authorized semiconductor/high purity market distributor for DPE.

Kalrez® Compound Material Recommendations			Case Study Results Using New Compound 9100 for PECVD
	Recommended Material(s)	Alternate Material(s)	Case Report #5130
PECVD:	9100	8085	<p>Customer: Southwest US Semiconductor Fab Tool: Novellus® Concept II / Sequel Chamber Component: Slit Valve Door Seal Process Chemistry: TEOS, TMP Doped TEOS, He Clean Chemistry: C4F8 Remote Plasma Process Temperature: 400-450C Estimated Seal Temperature: 150C Process Pressure: 2.2 Torr</p> <p>Prior Results: standard FKM seals lasted only one wet clean and produced high particle counts</p> <p>New Results: <i>Kalrez® 9100 bonded doors ran on four separate tools for nearly 2 years with <u>zero</u> particle or defect failures.</i></p>
Plasma Etch	9100 8085	8002	
Oxidation/Diffusion	7075UP	8475UP	
Anneal/RTP	8475		
Wet Process (most)	6375UP	4079UP	
Wet Process (Amines)	6375UP	1050UP	

Kalrez® Bonded Door Seals Perform Better

Bonded door seals offer compelling advantages.

- Fixed seal position eliminates Roll, twist, and abrasion
- FEA optimized seal profile minimizes stress concentration
- Reduced mechanical wear and particle generation, longer seal life

Call us to discuss if a bonded door design will work for you.

Bookmark these Helpful Sites

If you are selecting a new seal or designing a new seal groove, we recommend the Kalrez Application Guide:

<http://www.dupontelastomers.com/kag>

Another great tool is the Chemical Resistance Guide:

http://www.dupontelastomers.com/Tech_Info/chemical.asp

Kalrez® NW/KF Seals Fit Better, Cost Less

Typically o-rings used on “NW/KF” style centering rings are standard sizes, e.g. NW-40 rings use a size 2-326 o-ring. DPE performed extensive testing and determined that custom sizes would fit and perform better, and, because they require less material, cost less than the standard sizes.