

## Extending the Life of Implant Equipment and Lowering the Cost of Ownership

CORE Systems has the full capability to repair, refurbish and remanufacture any disk or heat sink. This includes all makes and models of batch processing ion implanters produced since the late 1970s to today. CORE is the only provider of refurbishment services to support such a broad timeframe of implanter models and design changes. The objective of our custom support is to extend the life of implant equipment and to continuously lower the cost of ownership for the Integrated Device Manufacturers (IDMs). OEM disk designs are never obsolete at CORE. We actively assess the field problems or life limited design issues to provide solutions and upgrades for our customers.

Because the wafer is implanted on the disk, the disk becomes part of the process. At CORE refurbishment provides global service that supports the implant process including qualification, installation, process testing, scheduled and unscheduled maintenance events, and end of life determination.

CORE's in-house PVD system, dedicated to silicon, guarantees purity.



Final testing & balancing at up to 1200 rpm in vacuum with water flow.

### CORE System's Benefits

- Resourced to meet diverse process and custom engineering requirements
- Global network of service, parts, and process support
- Proprietary elastomers designed to meet specialized process needs and life requirements
- Certified factory testing to assure fast start-up to production qualification
- In-house PVD silicon coating for longer life and fast turns
- CORE Systems is focused on delivering superior quality, long term service and longer life



### Axcelis GSD Disks: Super Disks, Manifold Type, Universal Hub Disk, Virtual Slotted Disk

Axcelis' GSD has been the most successful batch ion implanter since its introduction in the early 1990's. Over the last 2-decades there have been many designs, some now are considered obsolete. All types are refurbished by CORE, many with improved features and materials that extend production maintenance intervals and reduce costs.

CORE improved LRDF



200mm GSD Pedestal

300mm GSD Pedestal

### Varian VIISion

Varian's VIISion design has been very successful especially in Japan and Asia. CORE has worked with customers there to reduce the time to qualification after a disk replacement. This includes specialized silicon coating, surface finishing and improvements to the wear components such as the hook and roller assembly.



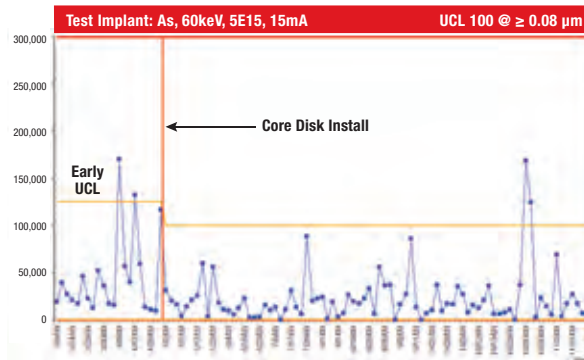
200mm Hooksite



### Customer Data

Each disk must meet the performance criteria for elemental contamination (front and wafer back side), wafer temperature from ion beams with 600W to 4000W beam power, particle contaminates typically less than 0.05/cm<sup>2</sup> at 0.08µm diameter on 20mm wafers, and life times of 250,000 to more than 300,000 wafer moves.

200mm GSD Particle Data  
103 Lots • April to November 2009



300mm GSD Frontside Elemental Contamination

PPM Dose; VPD-ICPMS Data				
Element	PPM	PPM	Avg PPM	Customer Spec. PPM
Na	0.79	0.92	0.85	1.0
Mg	0.81	0.77	0.79	1.0
Al	23.0	26.0	24.5	100
K	0.17	0.16	0.17	0.5
Ca	0.74	0.63	0.49	0.5
Ti	0.16	0.15	0.16	0.5
Cr	0.03	0.2	0.25	0.5
Mn	0.01	0.01	0.01	1.0
Fe	0.24	0.22	0.23	0.5
Ni	0.01	0.01	0.01	0.5
Cu	0.08	0.13	0.11	0.5
Zn	1.80	1.1	1.4	0.3

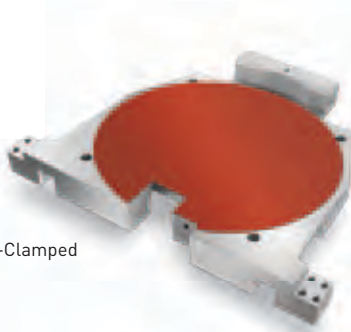
No Conditioning  
Immediate beam on wafers

## Axcelis and Varian Legacy Implanter Disks NV-10 & 80/160 XP

Although introduced in 1980, many legacy ion implanters are still in production and require disk refurbishing. CORE refurbishes all sizes and types including NV-10 Clampless and custom XP designs.



Axcelis NV-10-Clampless



Axcelis NV-10-Clamped



Varian 80/160 XP

## Applied Materials Heat Sinks

A variety of sizes and elastomer combinations of AMAT heat sinks have been offered over almost 30 years. CORE supports these heat sink configurations with customized elastomers and improved components. CORE elastomers can be tailored to provide increased thermal resistance, improved thermal conductivity or maximum contamination control to meet process demands.

150mm Clear



200mm Black



200mm Clear



300mm  
Black/Thermal

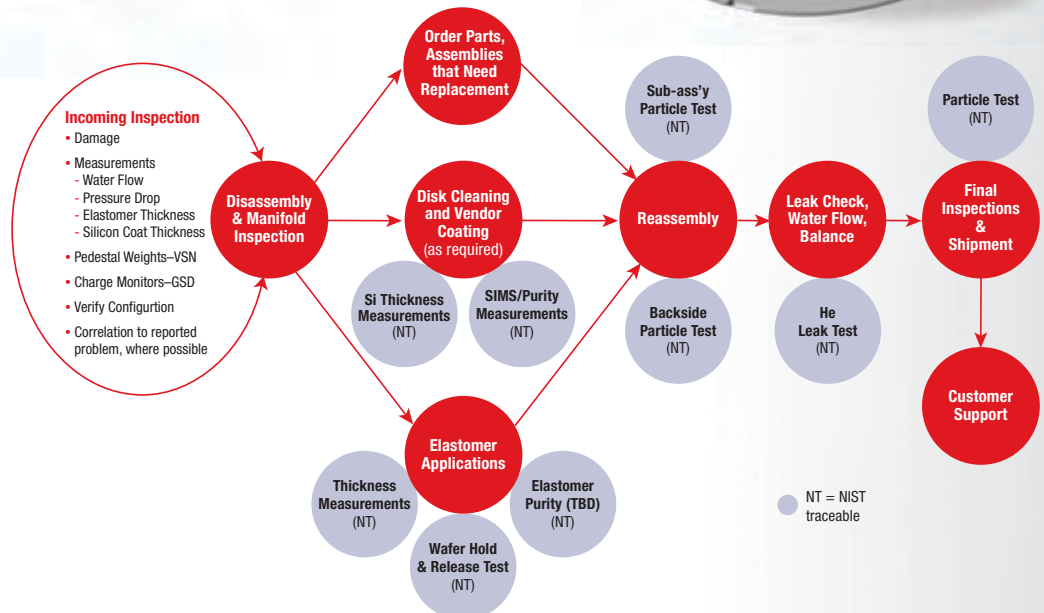


300mm  
White/Dielectric



## Disk Refurbishment

Incoming disks are carefully inspected to confirm their configuration and to determine what is required for proper refurbishment. Each step of the process is monitored and assessed for compliance to build specifications. At the end of refurbishment a Certificate of Compliance is issued which attests to meeting the customer or CORE specifications.



**Elastomers**

Since the wafer is in intimate contact with the backside of the wafer, whatever is transferred from the elastomer to the wafer is processed with the wafer. Even very low levels of heavy metals such as Fe, Cr, and Ni cannot be tolerated. The table shows customer data at levels in many cases approaching detection limits.

**Total Reflection X-Ray Fluorescence Surface Analysis of 200mm Wafer Backside**

TXRF Analysis Report • EAG Number COBCN426 • Core Systems, Inc.

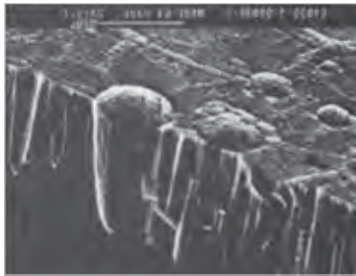
**TXRF Results for W source measurements (units of 10<sup>10</sup> atoms/cm<sup>2</sup>)**

COBCN426 slot 5	S	Cl	K	Ca	Ti	Cr	Mn	Fe	Ni	Cu	Zn
Center	<67	<14	<18	<5	<1.8	<0.8	<0.6	<0.7	<0.6	<0.3	<0.6
-50µm	94±13	<15	<15	<5	<1.7	<0.9	<0.6	<0.8	<0.8	<0.4	<0.5
-50µm	106±13	<14	<16	<5	<1.7	<0.8	<0.6	<0.5	<0.7	<0.4	0.7±0.3

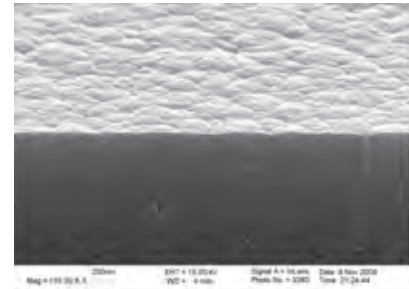
**PVD Silicon Coating**

CORE's unique in-house PVD coating system provides a more durable and longer lasting silicon coating compared to OEM flame spray or PECVD coatings. Having the capability on-site eliminates outside vendors which reduces process turn times and provides superior quality control.

**Near single crystal film morphology vs OEM columnar structure prone to ion beam wear**

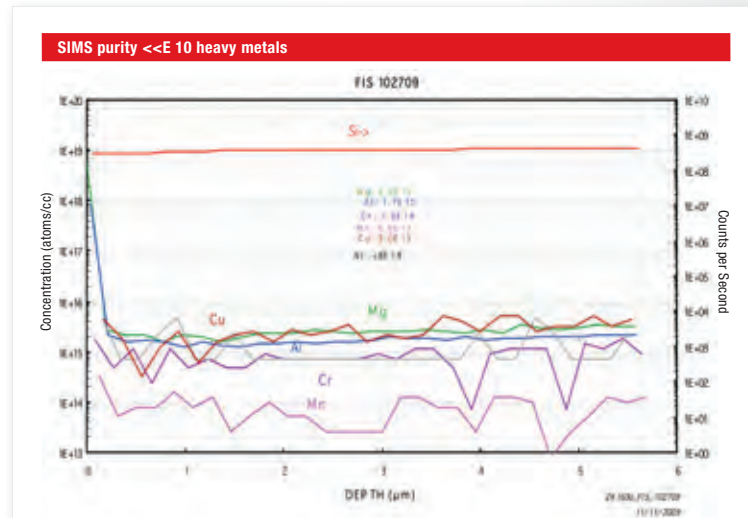


PECVD deposited silicon results in high levels of metallic contaminants and a rough surface topology.



PVD, unlike PECVD, coating demonstrates a smooth surface and elimination of columnar structure by high-density plasma layered interface.

**CORE PVD Purity**



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**About CORE Systems**

CORE Systems is a world leader in semiconductor ion implant outsourcing technology. CORE was founded in 1990 to supply ion implant technology, products and services to the semiconductor manufacturing community. The division headquarters is located in Sunnyvale, CA in the heart of Silicon Valley with unique access to customers, technology suppliers, materials and technical resources. With implant foundry locations in Sunnyvale, CA and Wuxi, China CORE can make fast turns in both North America and Asia. CORE distributes its ion implant products worldwide using both sales and a network of representatives and distributors.