Processing Equipment Technology for Magnetic Recording Media

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2007
PET for HDD?

- PET (2007) — Processing Equipment Technology
- Intevac’s Objective — Best PET Provider for the HDD Industry

Source: HGST, 2006
Strong Processing Equipment Technology Support Needed

Hard Drive Market Forecast

Source: TrendFocus, Annual 2007, Intevac Marketing After 2011 (assumes 12.5% CAGR after 2011)

Demand for Digital Data ~ 60%
Minus Areal Density (GB/in²) ≤ 40%
Growth In Hard Drives ~ 20%

Think Lean – Create Value
Areal Density Trends

Strong PET Support Needed for 40% CAGR Ahead

Source: TrendFocus, 2007
What’s New in Intevac’s PET Portfolio?

- **Media Interface**
  - AccuLuber
  - New Carbon Technology

- **Media Magnetics**
  - RF Sputtering Source
  - New Magnetron Poles

- **Production Enhancement**
  - Pre-Clean Source for Defect Reduction
  - Gen II for Cost Reduction

- **Future Technology**
  - HAMR
  - Patterned Media

*Continuous Commitment to Product Advancement*
Vacuum Vapor Lubing Technology

- Gravity-Drain Lubing Technology
  - Poor Control in Mean Thickness
  - Localized Poor Thk Distribution

- AccuLuber Provides Improved Process Control and Defect Reduction
  - Stand-Alone Setup
  - Precise Control in Lube Amount to Be Vaporized
    - More Accurate Control in Mean Thickness
  - Better Thickness Uniformity
    - ±1 Å for 95mm Form Factor
  - High Throughput
    - >1200 Disk/hr in Parallel Mode

AccuLuber™ – The First Vacuum Vapor Deposition System for Disk Lubrication
Enhanced Carbon Technology

- Developed on the Basis of the Production Proven NCT Mark V Technology

**NCT Mark VI Source**
- Gridless
  - No In-Situ Oxygen Cleaning Needed
  - Good for Production
- Higher Mass Density
  - Up to 2.3 g/cm³
- Higher Ratio of sp³ Bonds
- Better Corrosion Resistance

*Ultra-Thin, High-Density Carbon Overcoat for Excellent Corrosion Resistance and Low Particle Performance*
RF Sputtering Source

- Designed to Address Some Issues Observed in DC Sputtering of Oxide-Segregated Recording Layer in PMR
  - Target Spitting
  - Low Target Utilization
  - Yield Drop Due to Particles

- Compatible With 200 Lean

- Both Auto and Manual Match Modes Will Be Available
  - 3 KW Capability
  - RF Deposition Rate ~50% of DC Rate for Metal Targets With Argon
New Magnetron Poles

- Poles for Small Targets For 2.5 Inch Disks
- SUL Poles
  - Higher Target Utilization (53% ➞ 65%)
  - Coat 75% More Disk Per Target

Erosion Profiles for High Ms Targets
**Pre-Clean Source**

A Typical Configuration in Media Line

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Pre-Deposition Dry Cleaning Using HDP With Low Energy Ions

- Source Ion Density: $>10^{12}$ Ions/cm$^3$
- Ion Energy: ~30 Ev
- Oxygen or O$_2$-Ar Mixture Depending on Customer’s Requirement
200 Lean Gen II
Major Improvements

- Improved OEE
- Lower Cost for Consumables
- Improved Vacuum Performance
- 1000 dph Capable

Generations of Value in Magnetic Media
Heat Assisted Media Challenges

Capability to Sputter Hard Magnetic Layers at High Temperature is Critical for HAMR

Think Lean – Create Value
Relentless Focus on Industry Needs

- Support Industrial Ramps to High Volume Production
- Continuous Cost Reduction Improvements
- Extend PET Portfolio Ahead of Media Technology Demand
- Continue Developing Novel PET and Make 200 Lean® Extendible to All PMR, HAMR, and Patterned Media Technology Generations
Production Proven Tools

Over 100 200 Lean® Systems in Production

Think Lean – Create Value
Conclusions

- Intevac’s 200 Lean® Is a Production Proven Tool That Has Effectively Supported Our Customer’s Success in the Storage Market

- Intevac Is Committed to Supporting Our Customer’s Continuous Success by Providing the Best Processing Equipment Technology for the Media Industry

Leading the Way in Hard Disk Manufacturing