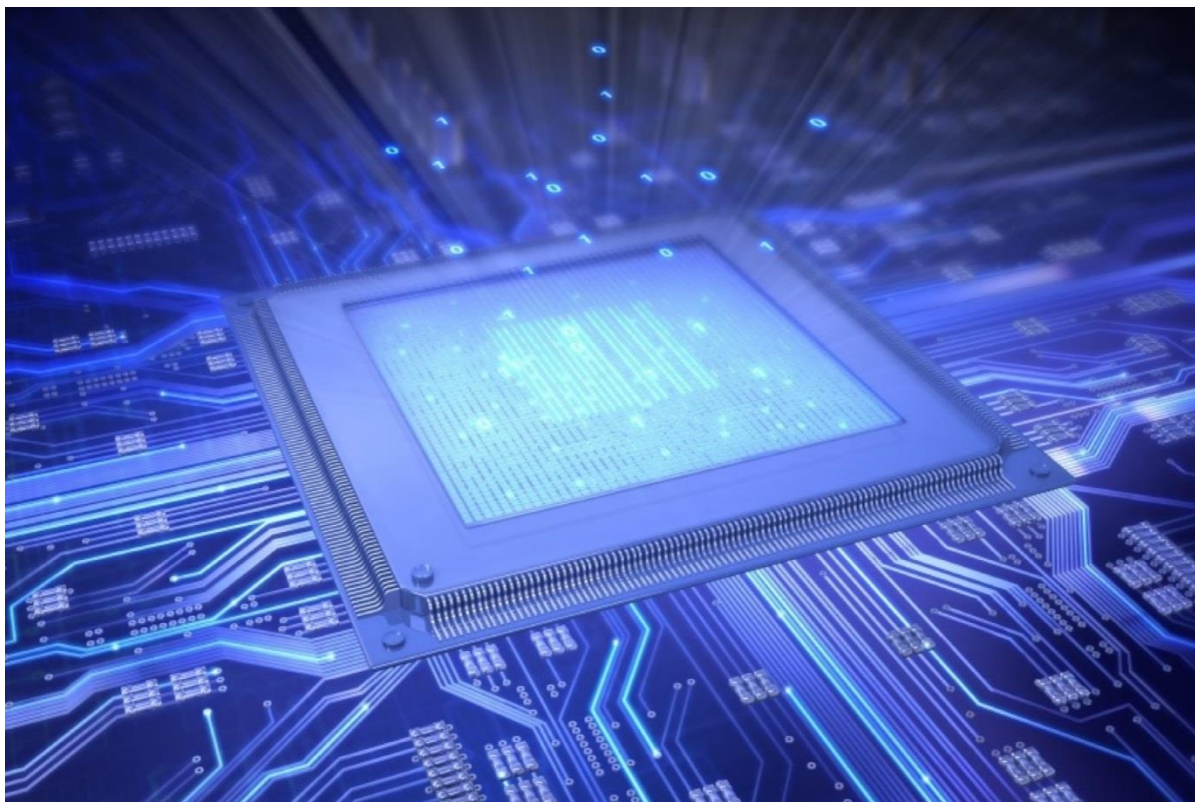




pure
performance



Critical Materials Council Meeting

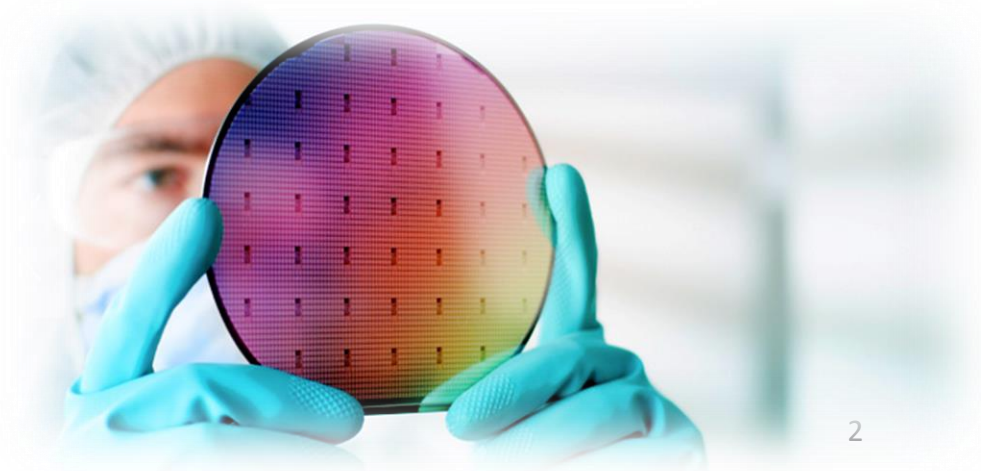
KMG
Electronic Chemicals

May 10, 2017

KMG
LISTED
NYSE

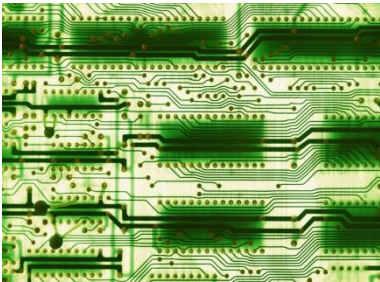
Agenda

- Introductions
- KMG Overview
- Supply Chain Performance
- Continual Improvement Program
- Technology Roadmap
- Key Challenges
- Hot Topic - *Metrology Gaps*



Three Business Platforms

Electronic Chemicals



Integral to the semiconductor manufacturing process



Wood Treating Chemicals



Preserve and protect wood used for electric power and utility infrastructure

Industrial Lubricants



Enable optimal valve performance and provide important safety benefits

Global Presence





Electronic Chemicals

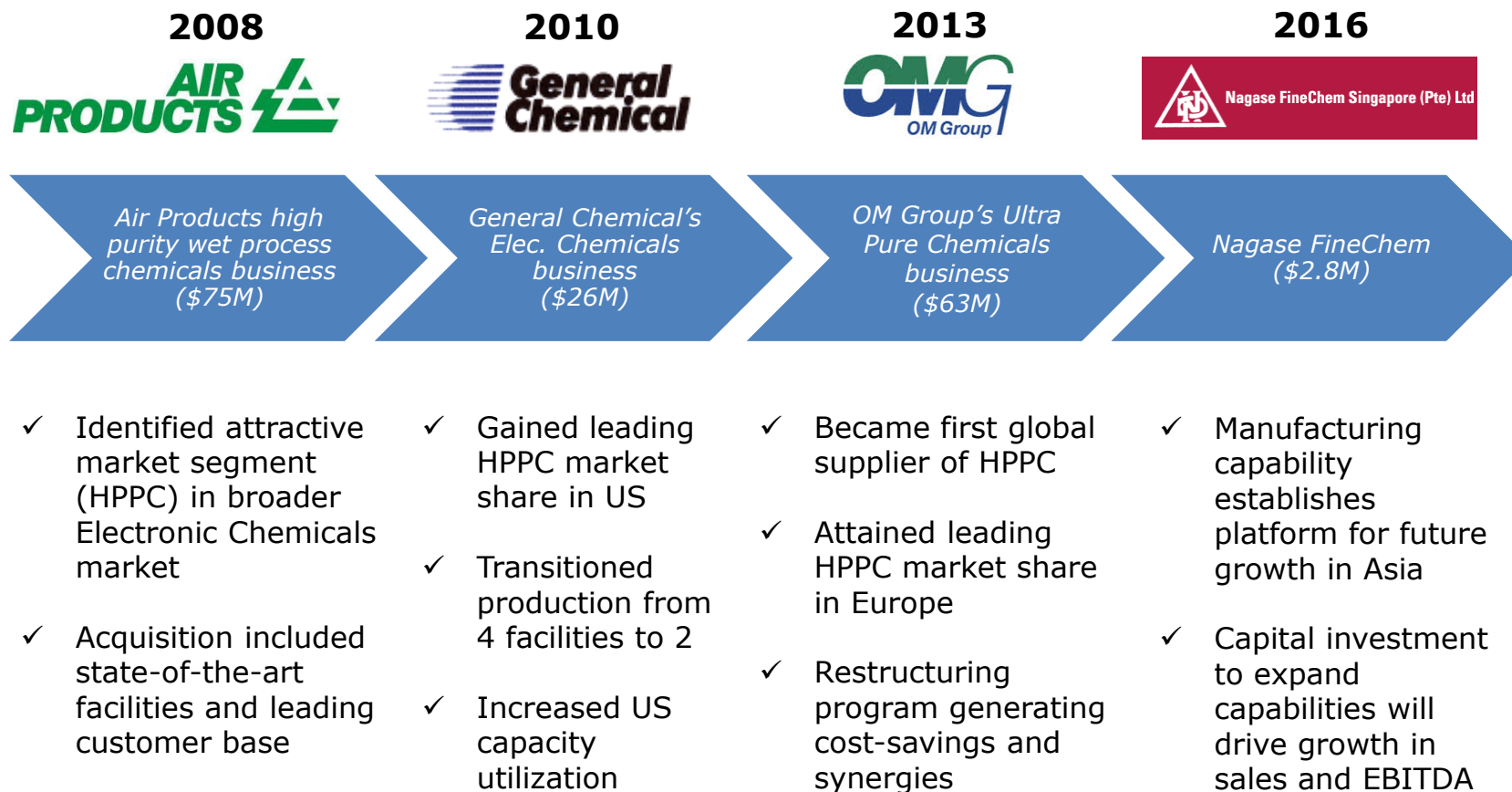
*pure
performance*

Electronic Chemicals Overview



- Global footprint with facilities in North America, Europe and Asia
- Specialize in the purification, formulation, blending and packaging of value-added chemicals for the semiconductor manufacturing industry
- Serve many of the world's leading semiconductor manufacturers
- \$262 million in FY16 net sales
- Strategic growth through consolidation
 - Completed 4 acquisitions since 2008
 - Manufacturing consolidation has enhanced operational efficiency and generated sustainable cost savings

Strategic Consolidation: Electronic Chemicals



❑ New Manufacturing Presence in Asia

- High purity acids, solvents & custom blends
- In house solvent purification & packaging capability
- Multi-million dollar investment underway to further expand manufacturing, purification and packaging capabilities

❑ TCM Services

❑ Analytical & Chem Logistics Support Services

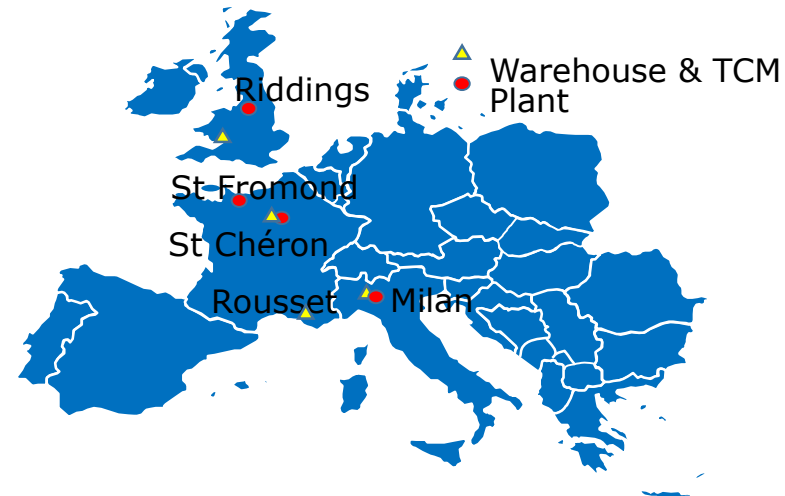


**Tuas - Singapore
Electronic Chemicals Facility**



EU Manufacturing & Warehousing

- ❑ **Strengthened and expanded EU footprint**
- ❑ State-of-the-art production, purification and packaging facilities
- ❑ Aqueous products and solvents
- ❑ Sub 10ppt Hydrogen Peroxide (*10nm filtration*)
- ❑ Sub 20ppt IPA & AH Quality
- ❑ Nitric Acid Purification



Milan, Italy
Electronic Chemicals Facility

US Manufacturing - Pueblo, CO

- ❑ State-of-the-art production, purification and packaging facility
- ❑ Aqueous products excluding solvents
- ❑ Performance blends (*ie. BOE's, MAE's, Nano-Strip[®], etc.*)
- ❑ High speed bottling, drumming and tote filling
- ❑ Sub-0.020 μm particle control capability



Pueblo, Colorado
Electronic Chemicals Facility

US Manufacturing - Hollister, CA

- ❑ Primary solvents facility for KMG
- ❑ In house solvent purification & packaging capability
- ❑ GenSolve® product line (*stripper*) and other solvent blends
- ❑ High speed bottling, drumming and tote filling
- ❑ Sub-0.010 μm particle control capability



Hollister, CA
Electronic Chemicals Facility

- **Sub-Supplier Management**

- Sub-Supplier Segmentation Allows for More Specialized Focus on “Top Tier” Suppliers
- KMG Has “World Class” Supplier Report Card Program
- Sub-Suppliers Playing More Critical Role in Excursion Management
- KMG [Business Continuity Plans](#) Address Potential Product Specific Supply Chain Interruptions

- **Capacity Constraints**

- [Sulfuric Acid](#) Supply Remains Tight
 - Multiple Capacity Debottlenecking & Expansion Efforts Underway
- Recent Exit of [HF](#) Supplier Impacting Molecule Availability

- Leading Edge Industry Requirements Driving Need for On-Going Investment and Resources to Improve Quality, Capacity & Reliability

- | | |
|--------------------------------------|----------------------------------|
| • Sulfuric | • Nitric |
| • IPA | • KOH |
| • Ammonium Hydroxide | • Solvent Blends |

How is the KMG Technology Roadmap Developed?

- KMG's Technology Roadmap Continually Evolves Based on:
 - Industry Needs
 - Strategic Customer Input
 - Advanced Material Learnings
- Continual Improvements Required in:
 - Analytical Methods
 - Purification
 - Manufacturing (*filtration, particle control, & assay control*)
 - Containers

Technology Roadmap

KMG TRM CONTENT

Particle Measurement & Control

“Center of Excellence”

- 20nm Particle Count Metrology
- Filtration Upgrades

Purification Evaluations

- Metals, Organics, Moisture

Product Improvements

- PPQ Roadmaps
- Low Organic Solvents

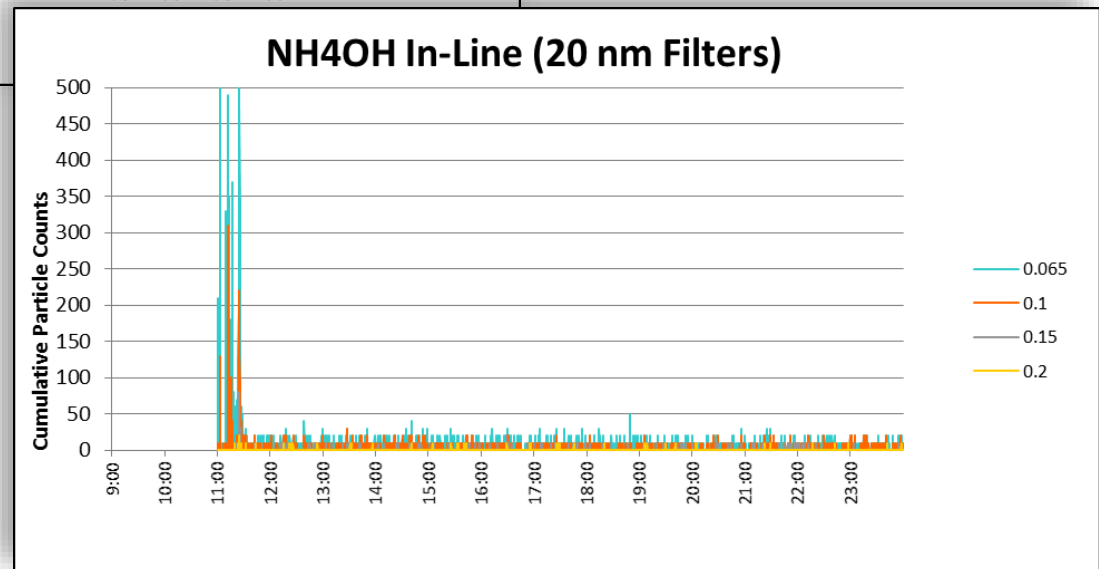
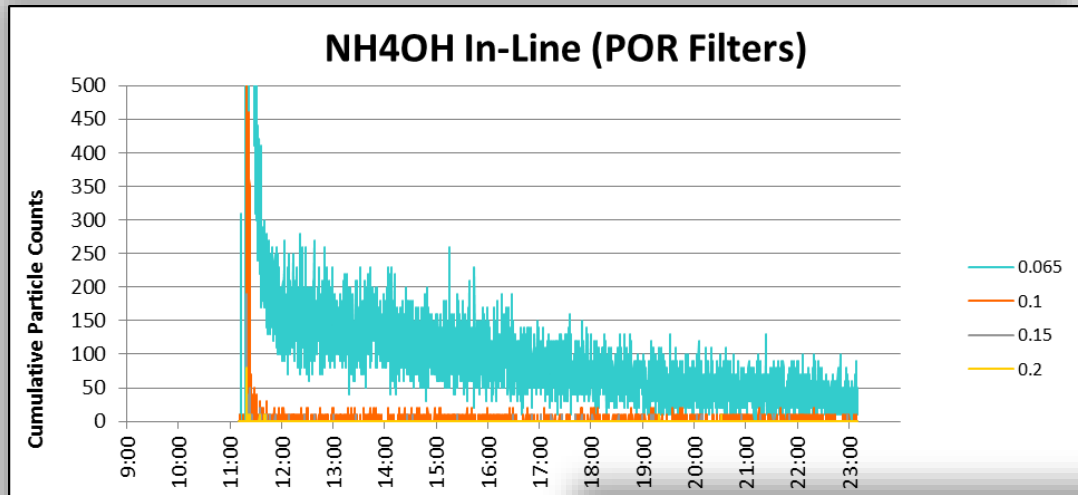
Analytical Metrology

- New ICP-MS
- Sample Prep Variability

Containers

- Best Available Materials of Construction
- Performance Over Time

Particle Control Continuous Improvements



- New Technology Node Requirements are a Moving Target
 - We Don't Know What We Don't Know
 - Intense Focus on Consistency of Supply
 - Incorporation of Advanced Material Characterization Learnings
- Supply Reliability
 - Improved Process Control Systems
 - Capacity Investments (*molecule, container fleets, etc*)
 - Staffing Needs
 - “Next Level” Sub-Supplier Management

PARTICLE MEASUREMENT

- Metrology Capabilities Lag Customer/Market Requirements
- Current Proven HVM Capability – 40nm
- KMG Committed to 20nm Particle Count Metrology
 - Extensive Evaluation of Market Offerings
 - Enhanced OEM Partnership Drove Accelerated Product Analysis
 - Significant Pueblo Investment

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Begins with
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[KMG Reports First Quarter 2015 Financial Results](#)
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Community involvement. It comes naturally to KMG.

KMG strives to be a good community partner, participating in various community programs through many of our locations around the world. From sponsoring elementary and middle school programs to building bikes for needy children...

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