

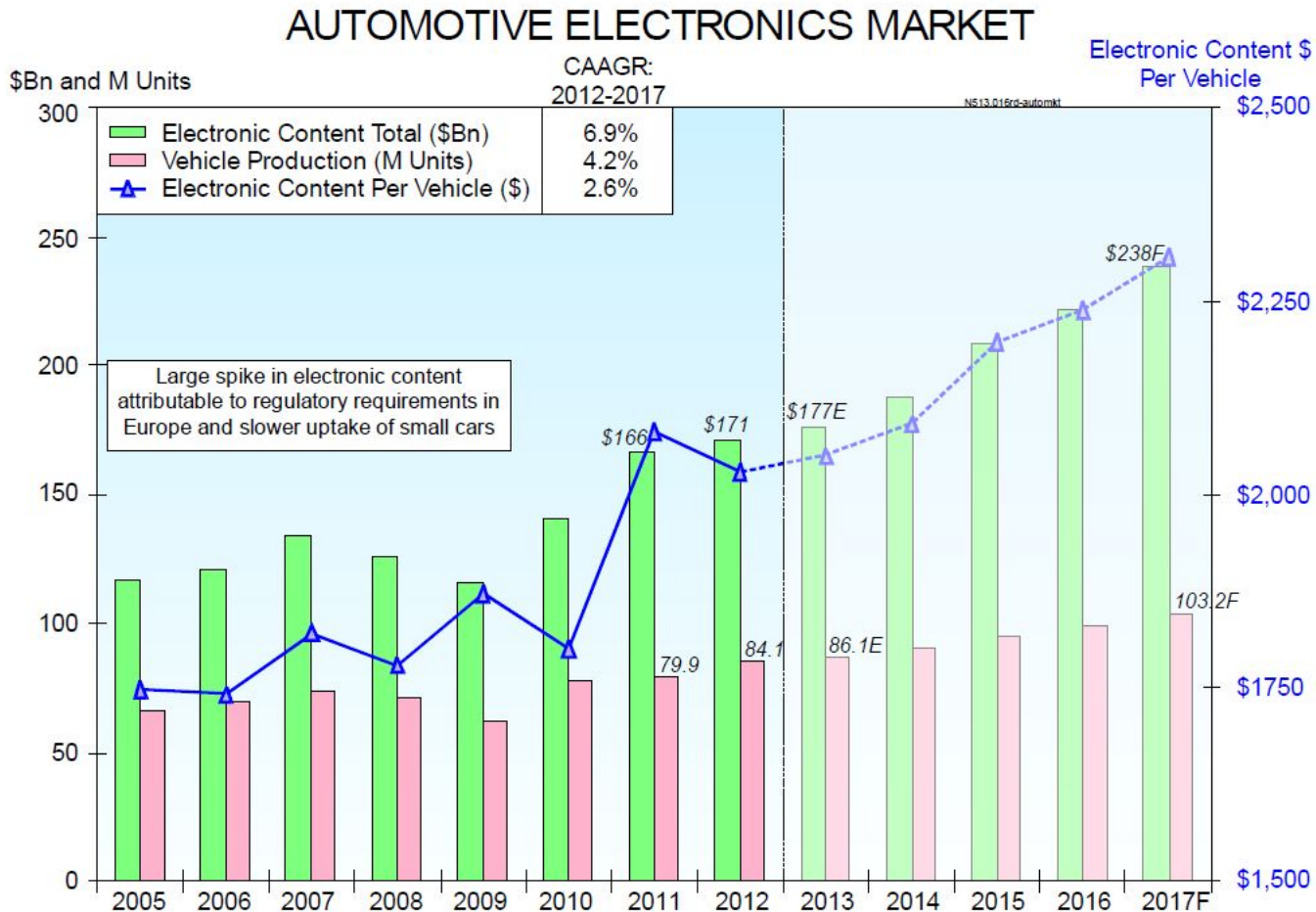
Advances in Automotive Electronics Soldering Technology

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Global Product Manager
Alpha, an Alent plc Company

Summary

- Automotive Market Growth
- Market Segmentation
- Automotive Market Trends
- Low Melting Point Solder for Automotive
- Future Developments
- Alpha Corporate Presentation

Overview



Macro Trends

Things finally getting smaller

- Rapid Miniaturisation for Some Newer Applications
 - CSP's becoming common in infotainment, vision systems and other in-cabin applications:
 - 0.5mm pitch CSP
 - 0201 passives
 - 0.4 pitch CSP for high end infotainment

Low Melting Point Soldering Niche

Modules

- Instrumentation
- Power Distribution
- Seat Electronics
- Interior Lighting
- Audio/Infotainment

Focus Areas

- Lower cost / high yield alloys
- Low temperature alloys for non critical applications
- Wave Elimination for Connectors
 - Reduce Cost of Assembly
 - Reduced process defects
 - Reduction of EC failures from flux

IN-CABIN ELECTRONICS (COMFORT, CONVENIENCE AND INFOTAINMENT)

ALPHA HAS A RANGE OF PRODUCTS WHICH CAN TRANSFORM THE COST OF PRODUCING ASSEMBLIES THROUGH PROCESS ELIMINATION, ENERGY REDUCTION AND REDUCED RELIANCE ON PRECIOUS METALS WHILST ENSURING RELIABILITY

SACX, LOW-TEMP & PREFORMS
FOR PROCESS ELIMINATION

POWERTRAIN/ CHASSIS (UNDERHOOD)

ALPHA HAS DEVELOPED TECHNOLOGIES TO PROVIDE MAXIMUM RELIABILITY INTERCONNECTIONS FOR ELECTRONICS OPERATING IN ENVIRONMENTS WITH EXTREME TEMPERATURE AND VIBRATION

INNOLOT ALLOY, ARGOMAX DIE SINTERING

PERIPHERAL VISION & DETECTION SYSTEMS

ALPHA HAS DEVELOPED A RANGE OF PRODUCTS TO ENABLE ASSEMBLY PROCESS PERFORMANCE AND YIELD FOR HIGH-DENSITY MINIATURISED ELECTRONICS TO OPERATE HARSH ENVIRONMENTS

ULTRA-FINE PITCH HALOGEN-FREE PASTES, ARGOMAX,
HALOGEN-FREE

EXTERIOR LIGHTING

INCREASED UTILISATION OF LED LIGHTING IN THE AUTO INDUSTRY

ALPHA HAS DEVELOPED A UNIQUE RANGE OF LEAD-FREE HIGH RELIABILITY DIE-ATTACH AND PCB SOLDERING SOLUTIONS

ARGOMAX, MAXREL

www.alpha.alent.com

In-Cabin Electronics

Comfort, Convenience and Infotainment

■ Key Drivers

- Total Cost of Ownership reduction
- Miniaturisation
- EC reliability under dewing conditions

■ Current Positioning

- Strong representation of SAC alloys (SAC305 – SAC405)
- Lower Ag alloys have proved to be a good fit in certain applications, not yet widely introduced

■ Potential compelling value proposition

- Collaborative approach to enable switch to low Ag and low temperature and transition to the low temperature alloy processing
- The Total Cost of Ownership reduction makes it a compelling value

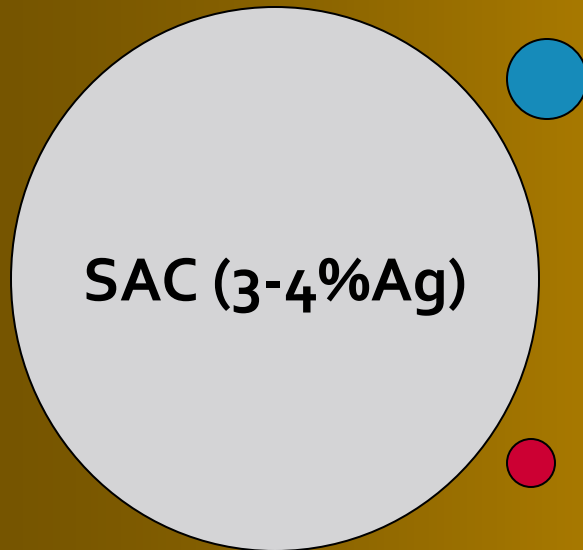


Macro Trends – Application Specific Alloy

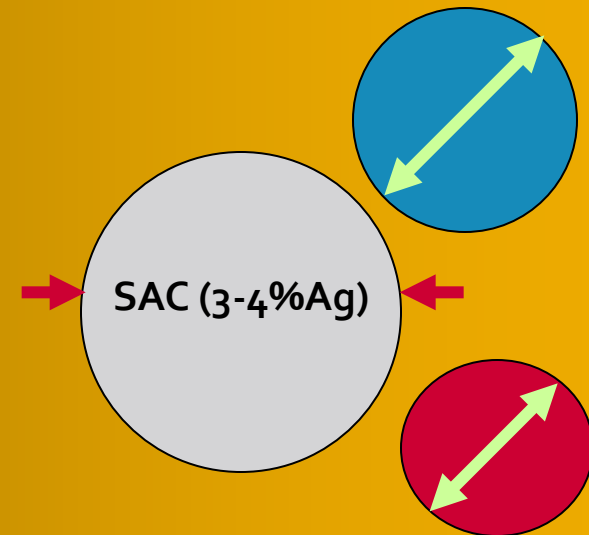
- Trending to lower cost and/or higher performance
- SAC dominance to decrease
- Low Temperatures Alloys are presenting a compelling value (melting point around 138-140 °C, eutectic and non-eutectic alloys)
 - o SnBi Ag
 - o SBX02 (no Ag alloy)

Macro Trends – Application Specific Alloy

2012



2015



High Operating T
Capable Alloys



Low Ag & Low
Temp Alloys



Expanding



Contracting

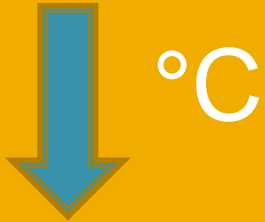
Active Developments

- Development directions
 - New alloy development
 - improve mechanical properties of the solder bulk
 - New paste chemistry development
 - enhance the mechanical properties of the joint

Next On - Alloys

217°C -
227°C

- SAC alloys
- High mechanical reliability



- New alloys
- Improved mechanical reliability

Next On - Chemistries

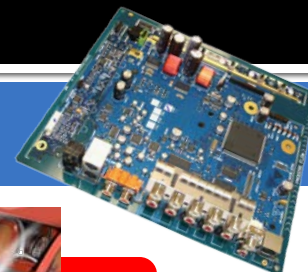
- Improved mechanical reliability of the solder joint through chemistry
- Improved electrical reliability of the assembly - SIR: IPC, Bellcore, JIS, Bono.....

About Alpha

- An Alent plc company
- Date of Origin: 1872
- Global Operations:
 - 21 Manufacturing Sites
 - 4 Research and Development Centers
 - Operations in 27+ Countries
 - 1,290 Employees
 - 2012 Sales: £439 m (\$707 m)

Key Markets

Electronics Assembly & Semiconductor Packaging



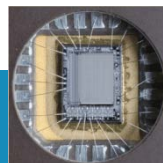
Automotive



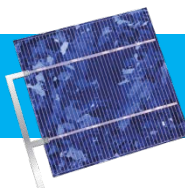
Metals Reclamation



Power & LED Devices



Solar Photovoltaic



Water Treatment



Sales Support in Every Major Electronics Mark



AMERICAS-USA

California	Ontario, Canada
Florida	Guadalajara, Mexico
Georgia	Tijuana, Mexico
Illinois	Buenos Aires, Argentina
Mass.	Tierra del Fuego, Argentina
New Jersey	Sao Paulo, Brazil
Ohio	Manaus, Brazil
Pennsylvania	
Texas	

EUROPE

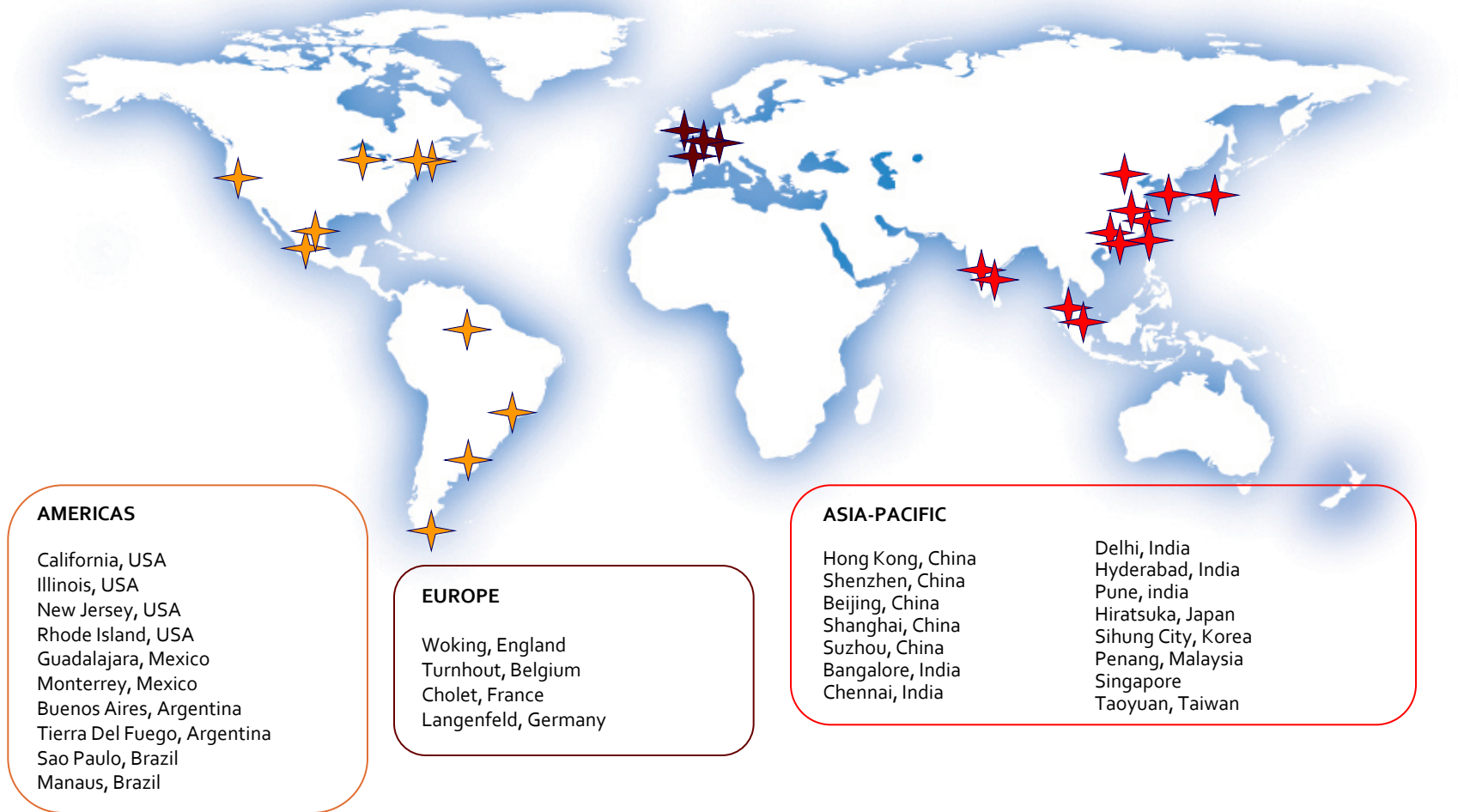
Woking, England
Turnhout, Belgium
Cholet, France
Langenfeld, Germany
Budapest, Hungary
Milano, Italy
Naarden, Netherlands

ASIA-PACIFIC

Hong Kong, China
Shenzhen, China
Beijing, China
Chengdu, China
Nanjing, China
Shanghai, China
Suzhou, China
Tianjin, China
Xiamen, China
Bangalore, India
Chennai, India

Delhi, India
Hyderabad, India
Pune, India
Hiratsuka, Japan
Sihung City, Korea
Penang, Malaysia
Muntinlupa, Philippines
Singapore
Taoyuan, Taiwan
Bangkok, Thailand
Thomastown, Australia
Auckland, New Zealand
Vietnam

Customer Technical Support in Every Major Electronics Market



Manufacturing Sites

Multiple Sites to Ensure Continuity of Supply



AMERICAS

Illinois, USA
Pennsylvania, USA
Mexico City, Mexico
Monterrey, Mexico
Manaus, Brazil
Sao Paulo, Brazil

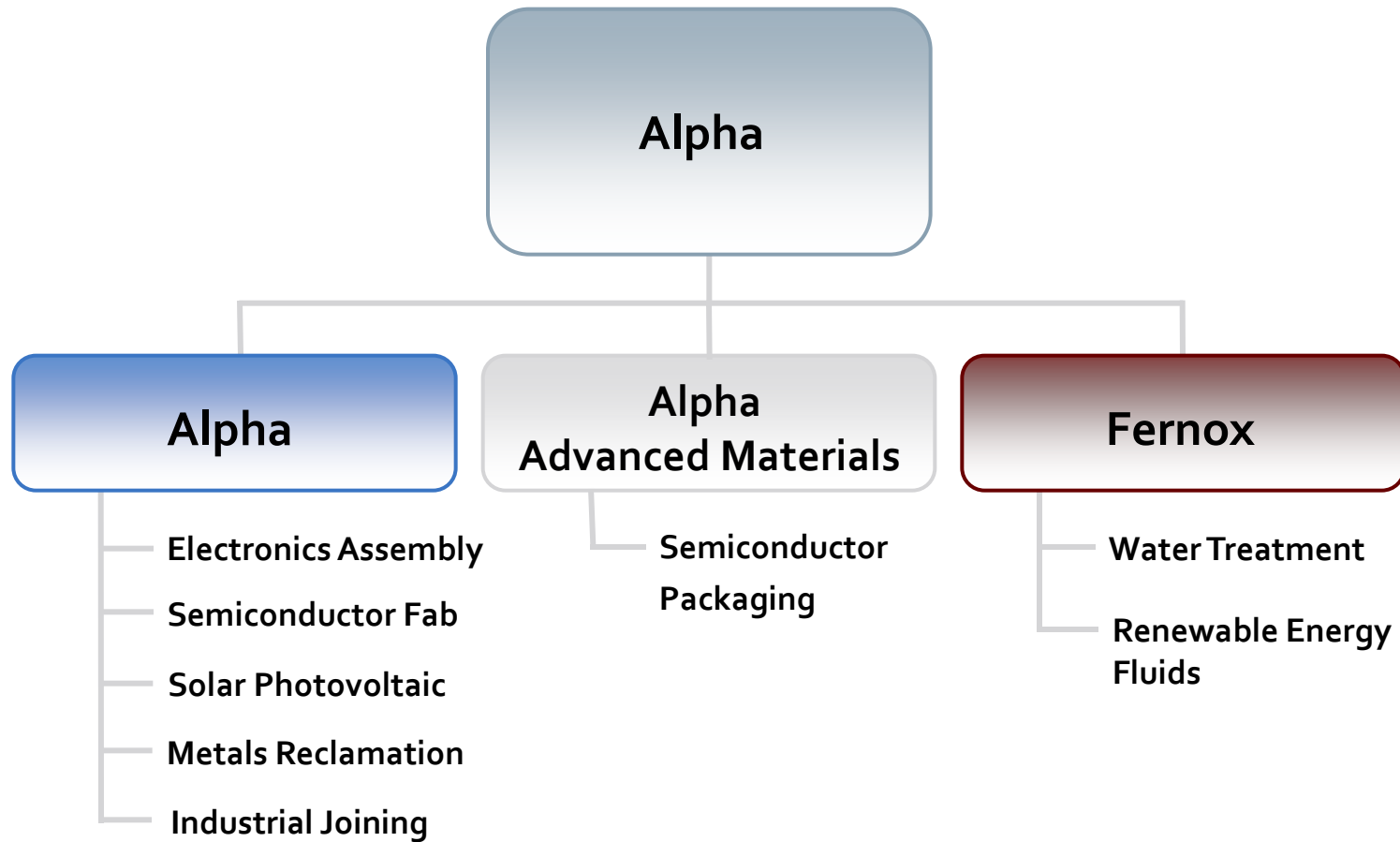
EUROPE

Woking, England
Turnhout, Belgium
Cholet, France
Budapest, Hungary
's-Hertogenbosch, The Netherlands
Naarden, The Netherlands

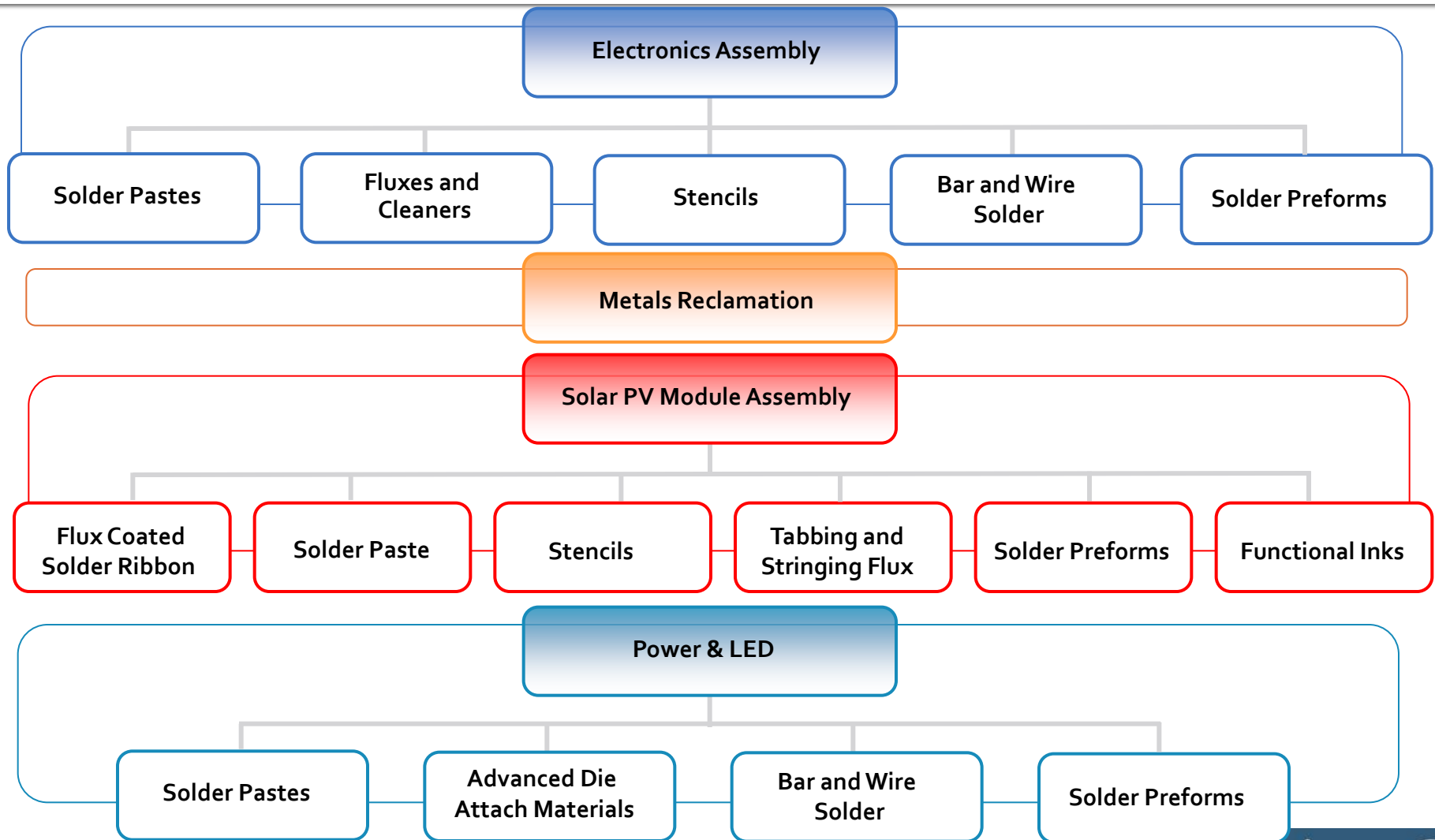
ASIA-PACIFIC

Hong Kong, China
Guangxi, China
Shenzhen, China
Shanghai, China
Chennai, India
Hiratsuka, Japan
Sihung City, Korea
Singapore
Taoyuan, Taiwan

Markets Lines by Business

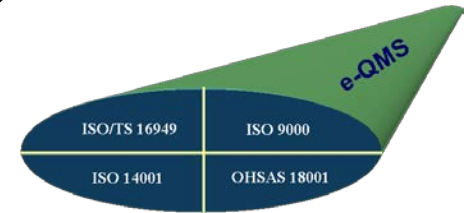


Key Product Lines by Market



Management Systems (QMS, EMS, OH&S)

- A Global electronic Quality Management System (**eQMS**) is installed at every Alpha site to manage documents and Quality activities, including Environmental Management System (**EMS**) and Occupational Health and Safety (**OH&S**) systems via a single Registrar, BSI.
- All Alpha manufacturing facilities have direct lot traceability for manufactured products through a global ERP system (JDE), SOP's, and WinLIMS (i.e. Operators, Intermediate Components, Raw Materials).
- Alpha's manufacturing facilities are all QMS certified. Listed below are the number of Management System certifications via a single Registrar, BSI.

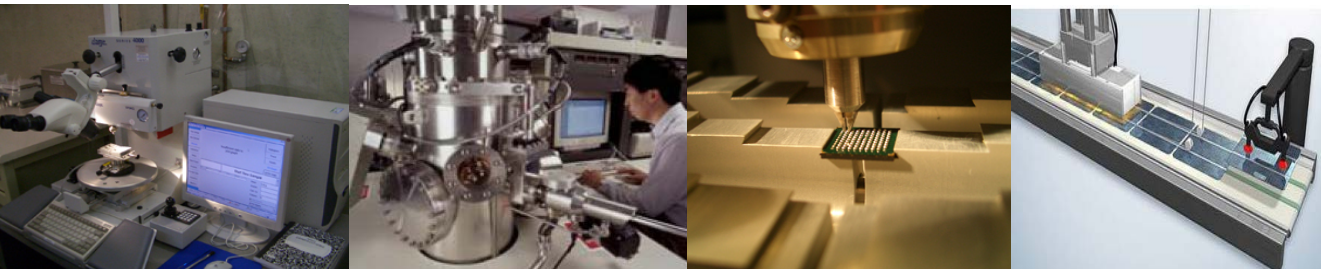


ISO 9001:	26 Facilities (Regional Certifications)
ISO/TS 16949:	3 Mfg. Facilities & 2 Supporting R&D Centers
ISO 14001:	18 Mfg. Facilities
OHSAS 18001:	13 Mfg. Facilities (and growing)

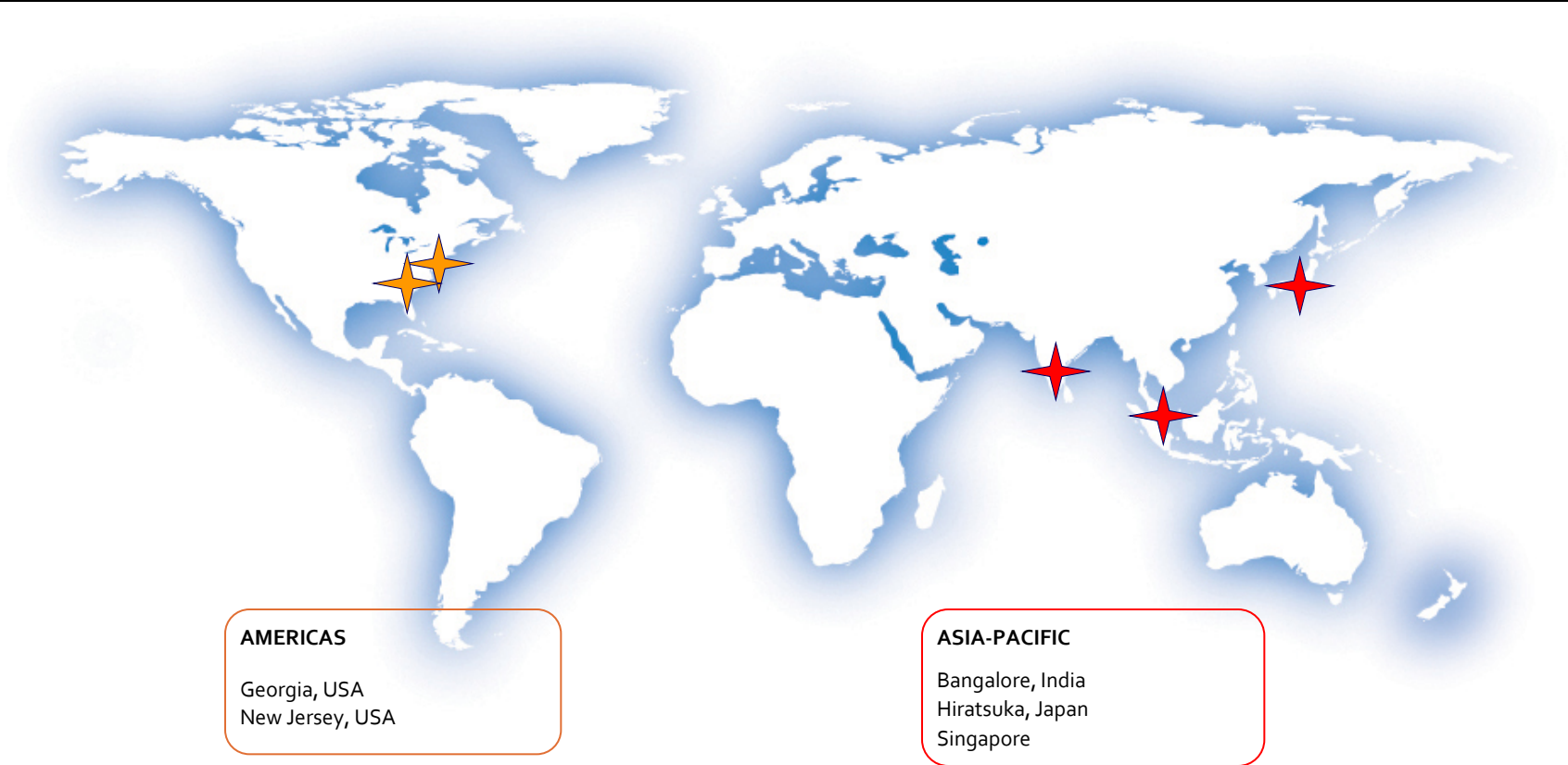


Alpha Research and Development

- Integrated Worldwide Product and Technology Development
- 98 Scientists & Engineers (Alpha/AAM/Fernox)
- 26 PhD graduates
- Regional R&D Laboratories
 - US (2), India, Japan, Singapore
- 500+ Patents
- Excellent Technical Capability
 - Analytical & Diagnostic Labs
 - CPM Analytics (US and Bangalore)
 - Extensive Electronic Assembly Line Assets (US, India, Japan)
 - University Alliances/Collaborations Worldwide (Oxford, IISc, Auburn and others)



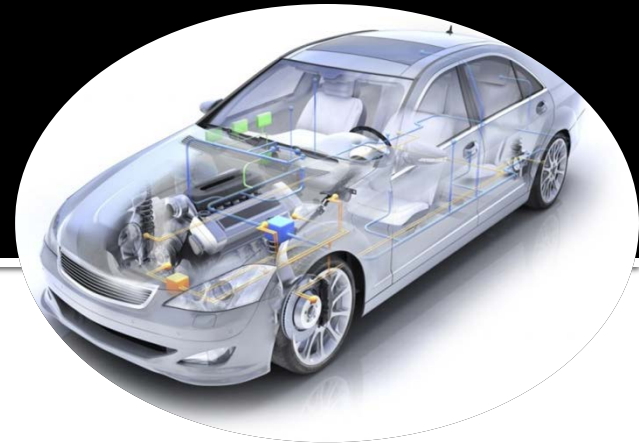
Global Research and Development Laboratories



Alpha Vision Statement

"We will be the industry's preferred supplier of high-performance materials and chemistry by delivering leading technology...represented by our innovative products, processes and people."





THANK YOU!