Chapter 7

General Industrial Finishes

Scope

- Coatings that protect and/or add decorative finishes to miscellaneous manufactured products
  - Powder and liquid (waterborne and solventborne) coatings; application-dependent, energy-cure coatings are growing in use in some regions
- Application
  - Factory setting by OEM
  - Interior and external surfaces of manufactured products representing a wide variety of (mostly) metal and plastic substrates
    - End-use examples: Agricultural, construction, and earthmoving equipment (ACE); appliances; electrical and HVAC equipment; sporting goods; industrial machinery; non-wood furniture; computer and related electronics equipment (IT), shelving, racks, lockers, blinds and shades, lighting fixtures, burial caskets, musical instruments; signage; dumpsters; fasteners, gaskets, packing and sealing devices.
- Exclusions
  - Coil coatings (Chapter 2)
  - Powder coatings (Chapter 3)

MARKET OVERVIEW

2019 General Industrial Finishes within the Industrial OEM Sector

Figure 7-1: General Industrial Finishes Volume – 5.4 Billion Liters

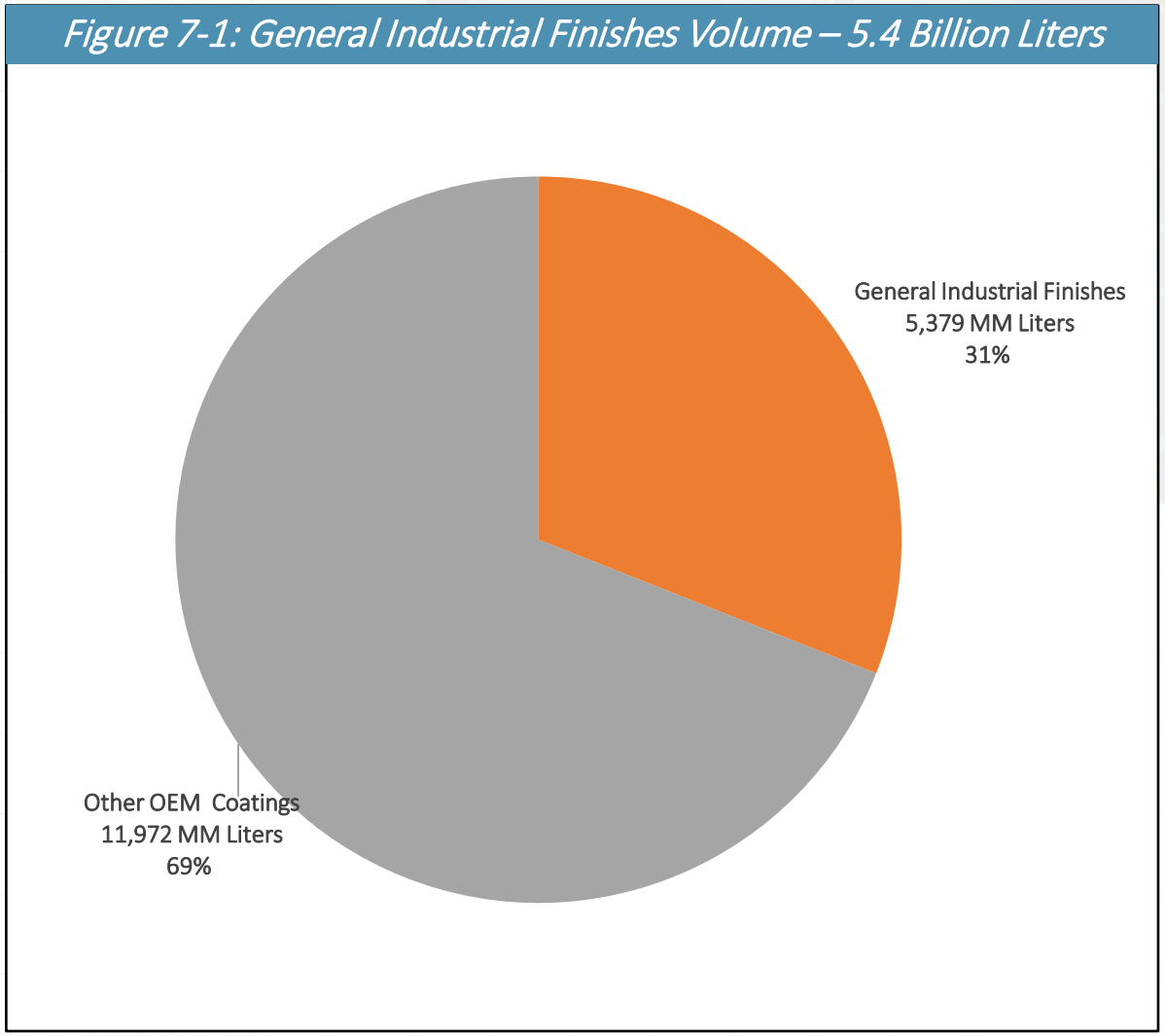
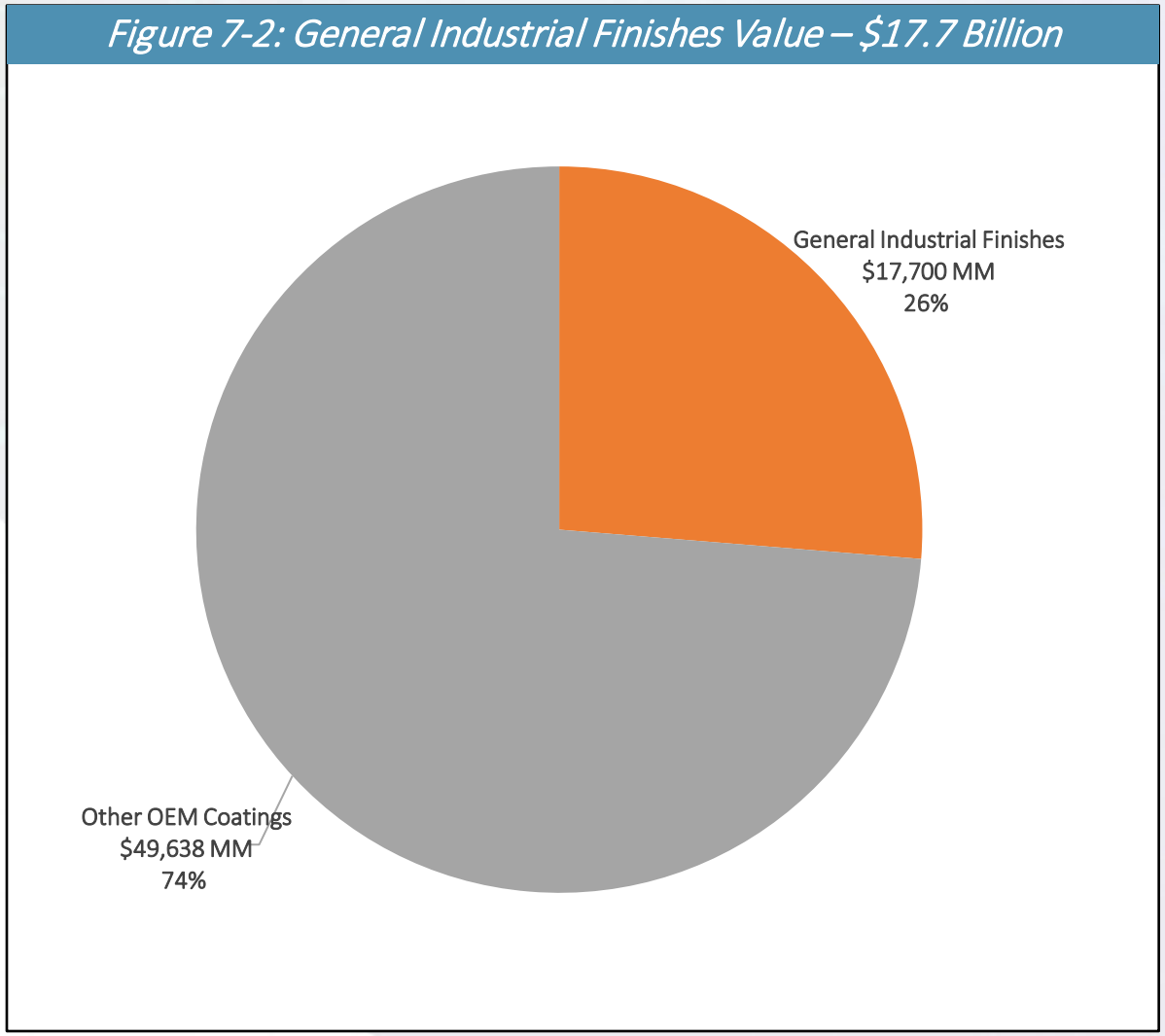


Figure 7-2: General Industrial Finishes Value – $17.7 Billion



Source: The ChemQuest Group, Inc.

Sector Analysis

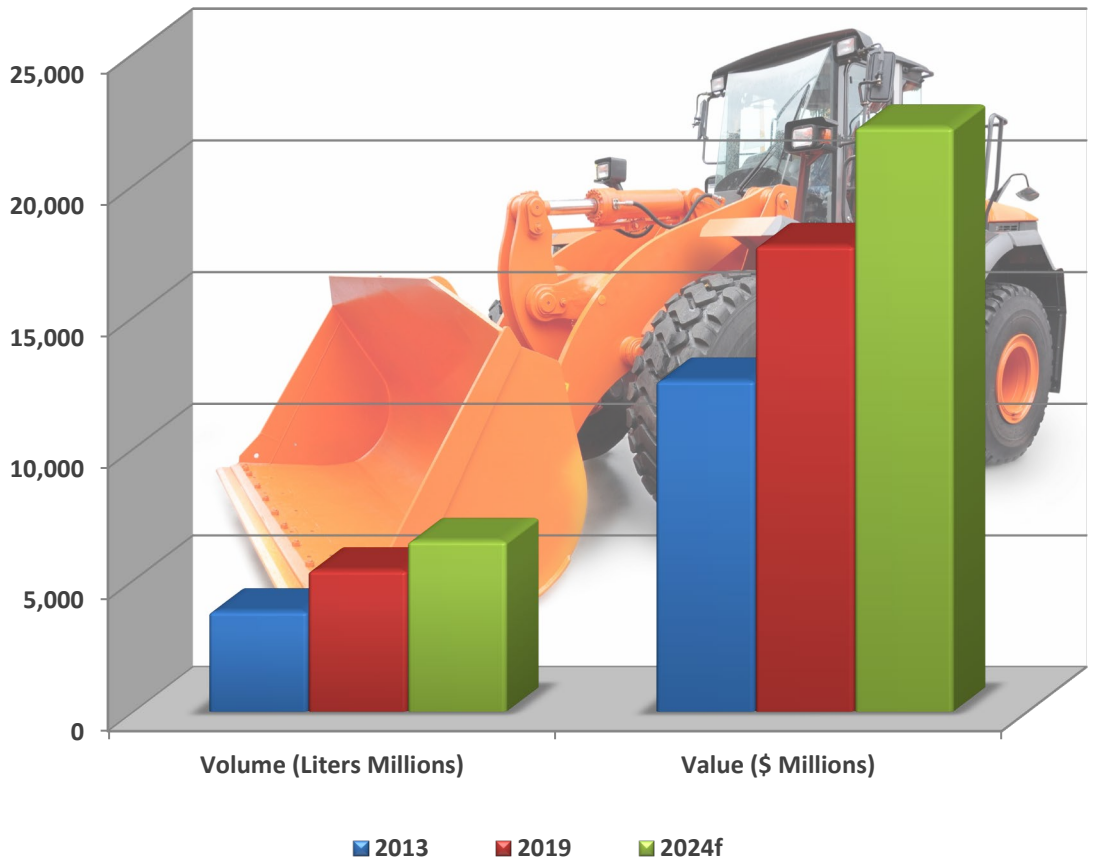
- Sector: industrial OEM coatings
- General industrial finishes sales volume and revenue:
  - 2013 revenues: $12.6 billion sales on 3.8 billion liters
  - 2019 revenues: $17.7 billion sales on 5.4 billion liters
    - 2013–2019 comparison (CAGR): 5.9% increase in volume; 5.8% increase in value.
  - 2024f revenues: $22.2 billion sales on 6.5 billion liters
    - 2019–2024f comparison (CAGR): 3.9% increase in volume; 4.6% increase in value.
- General industrial finishes: represents one of the largest industrial segments, but has a lower average price per liter than other segments
  - 31% of volume and 26% of value of 2019 industrial OEM market
  - 12% of volume and 11% of value of overall 2019 global coatings market

Quantitative Data (2013–2024f)

Table 7-1: Volume, Value, Price Growth (2013–2024f)

	2013	2019	2024f
Volume (Million Liters)	3,821	5,379	6,500
Value ($ Million)	12,585	17,700	22,200
Average Selling Price $/L	3.29	3.29	3.42
	2013	2019	2024f
Volume		5.9%	3.9%
Value		5.8%	4.6%
Average Selling Price		0.0%	0.7%

Figure 7-3: Volume/Value of Gen Industrial Finishes (2013–2024f)



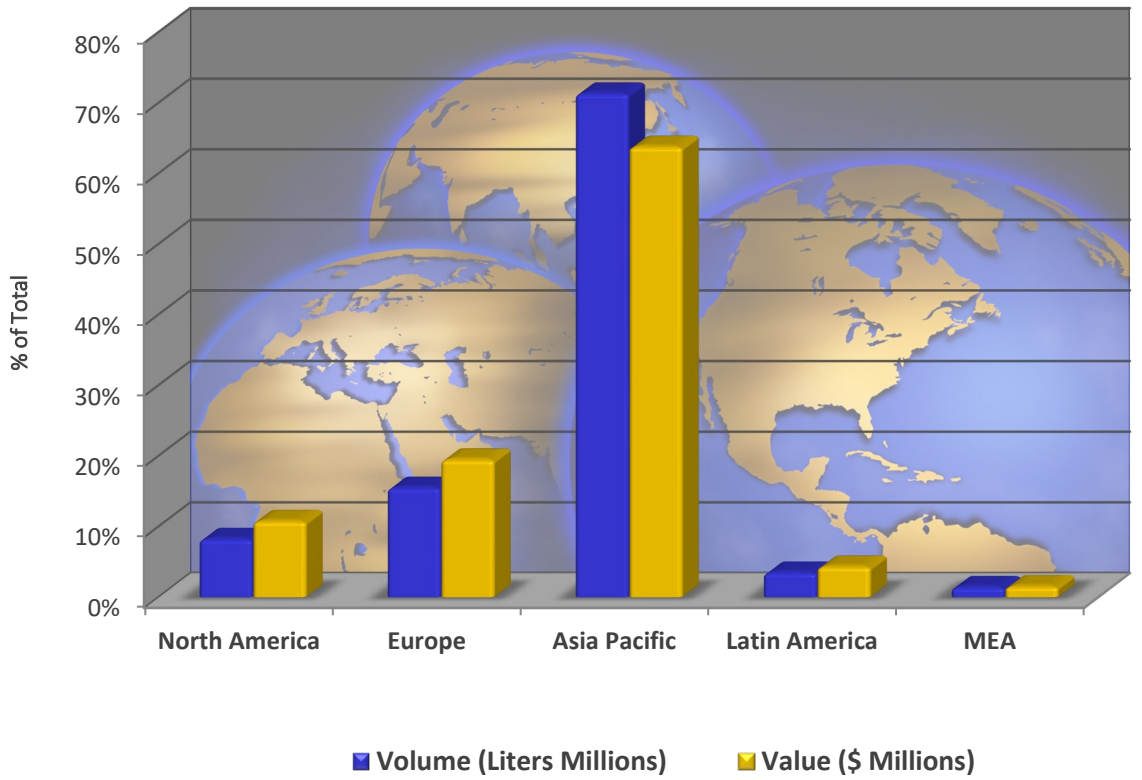
Source: The ChemQuest Group, Inc.

Regional Distribution

Overview

- APAC is the leading region in both volume and value of general industrial finishes.
  - While China is the largest coatings consumer and producer, its growth is declining as it transitions from a manufacturing-driven to a service-driven economy.
- North America is the leader of ACE manufacturing. ACE manufacturers are the largest group of finishes consumers.
  - Agricultural – top 10
    - North America – John Deere (U.S.), AGCO (U.S.), Alamo (U.S.)
    - Europe – CNH Industrial (Netherlands), MTZ (Russia), SDF (Italy), Manitou (France), CLAAS (Germany)
    - APAC – Mahindra Tractors (India), Kubota (Japan)
  - Construction – top 10
    - North America – Caterpillar (U.S.), Terex (U.S.), John Deere (U.S.)
    - APAC – Komatsu (Japan), Hitachi (Japan), Sany (China), Doosan Infracore (South Korea), Zoomlion (China)
    - Europe – Volvo (Sweden), Liebherr (Germany)

Figure 7-4: Regional Distribution of Volume and Value (2019)



Source: The ChemQuest Group, Inc.

Competitive Landscape

Overview

- General industrial finishes = least consolidated supplier market
  - Many OEMs tend to stay with a supplier once a good relationship has been established = high barrier of entry
    - Customer loyalty is a result of supplier's high degree of knowledge of each customer's unique business requirements, allowing for quick responses.
    - China has 10,000 industrial coatings manufacturers. In 2018, top 100 = 49.32% of the market.
- Large multinational companies are active in the market, but don't dominate like they do with other coating segments.
  - Notable: AkzoNobel, Axalta, Nippon Paint, PPG, Sherwin-Williams
- Numerous SEMs compete against the larger companies.
  - Some compete across multiple subsegments within local or regional markets. Others compete within specific technology and application niches.
  - Many smaller companies succeed by offering fast turnaround times of small, custom batches.

Table 7-2: Examples of Regional & Local Suppliers

North America	Western Europe	C+E Europe	APAC	C+S America	MEA
ICP Group (U.S.)	Karl Wörwag (Germany)	Kayalar Kimya (Turkey)	Kangnam Jevisco (South Korea)	Pintuco (Columbia)	Kansai Plascon (South Africa)
	Grebe Group (Germany)		Musashi Paint (Japan)		Crown Paints (Kenya)
	Industrias Titán (Spain)		Berger Paints India (India)		
	Farbex (Italy)		Chugoku Marine Paints (Japan)		
	Covestro (Germany)		Xiangjiang Paint (China)		
			Daoqum Chemical Group (China)		
			Bardese Group (China)		
			Korea Chemical Co (South Korea)		

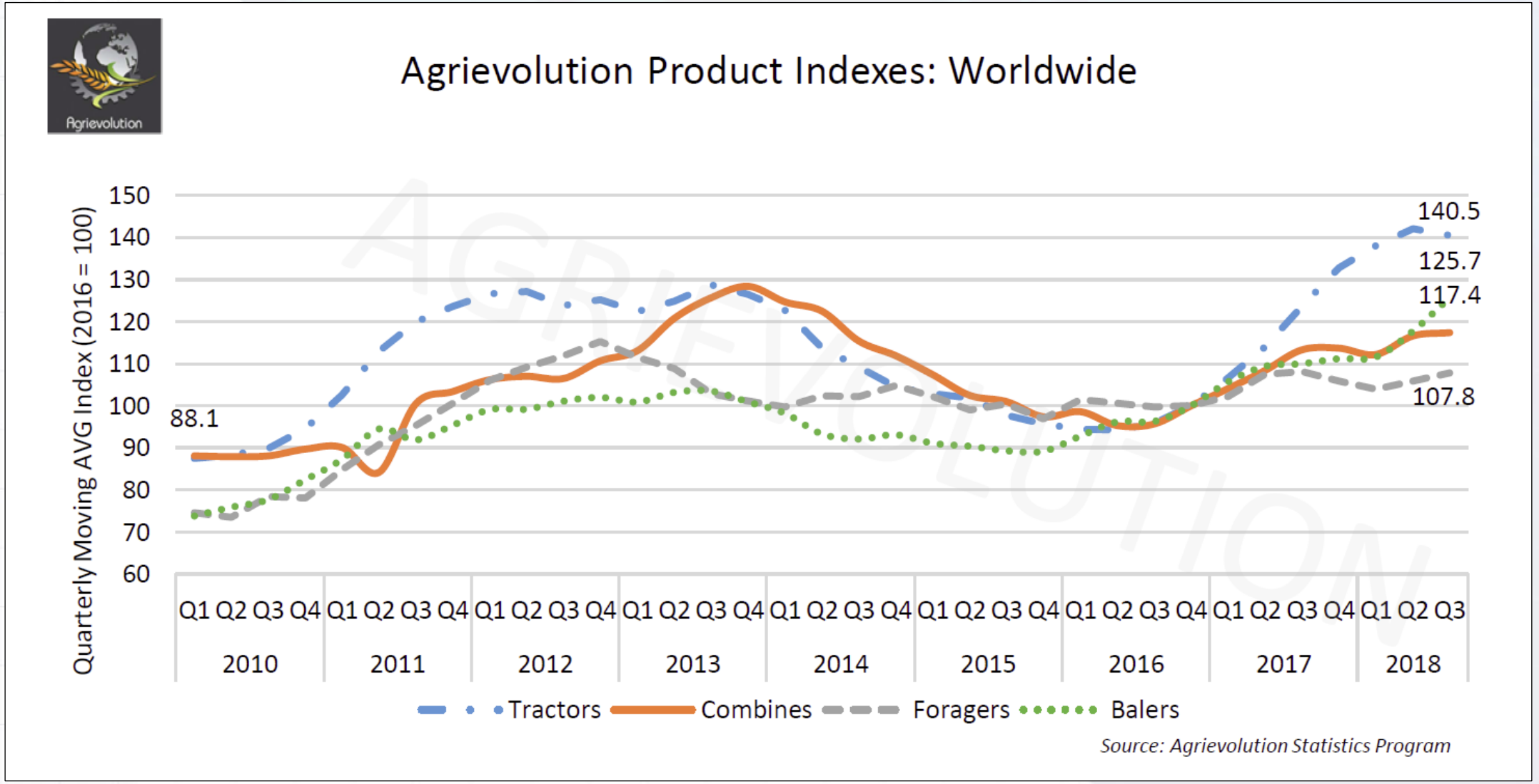
Source: The ChemQuest Group, Inc.

MARKET DYNAMICS

Macro Drivers

- Machinery and equipment markets are increasingly multinational
  - Slowdowns in an individual economy will likely affect domestic demand for M&E finishes.
- Key growth drivers for M&E finishes include:
  - Population growth; infrastructure growth; water conservation
  - Farm revenue / efficiency benchmarks
  - Urbanization
- Number of units produced, which varies with economic conditions, affects coatings usage.
  - Growth closely follows several key economic indicators such as construction and manufacturing output, commodity prices, corporate profit margins, and short-term interest rates.
    - M&E finishes is highly vulnerable to volatility in commodity markets.
      - Yield amounts and crop prices = crop value = increase/decline in agricultural machinery and equipment demand
      - Metal prices dictate level of mining and related processing activity.
  - Industrial equipment products are expensive, with machinery commonly purchased on credit.
    - Companies are more likely to purchase new machinery or equipment when profit margins are high.
    - Equipment age is a purchase driver.

Figure 7-5: Global Quarterly Index on Select Agricultural Equipment Shipments (2010–2018)



Global Ag Equipment Growth: $127.5B in 2017 to $165.8B in 2022

Figure 7-6: Global Agricultural Equipment Demand by Product Type

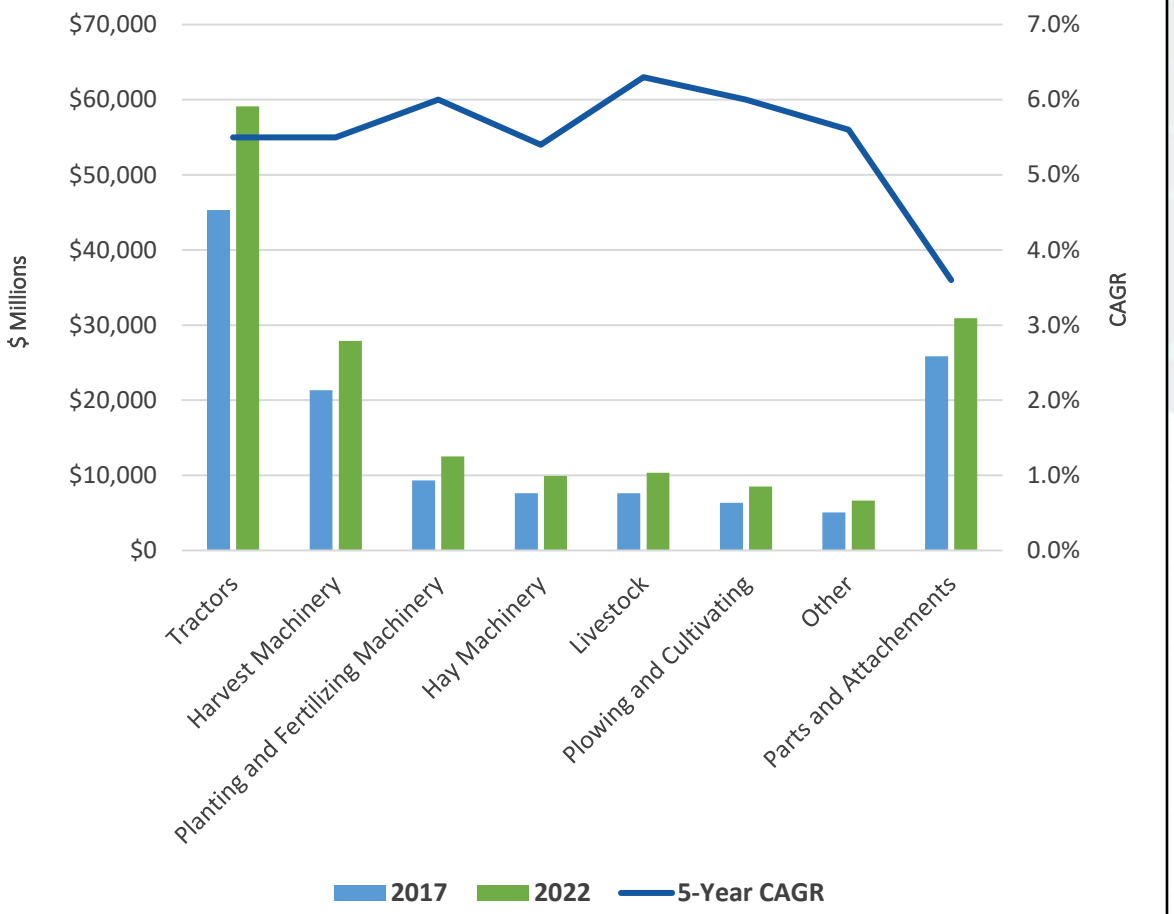
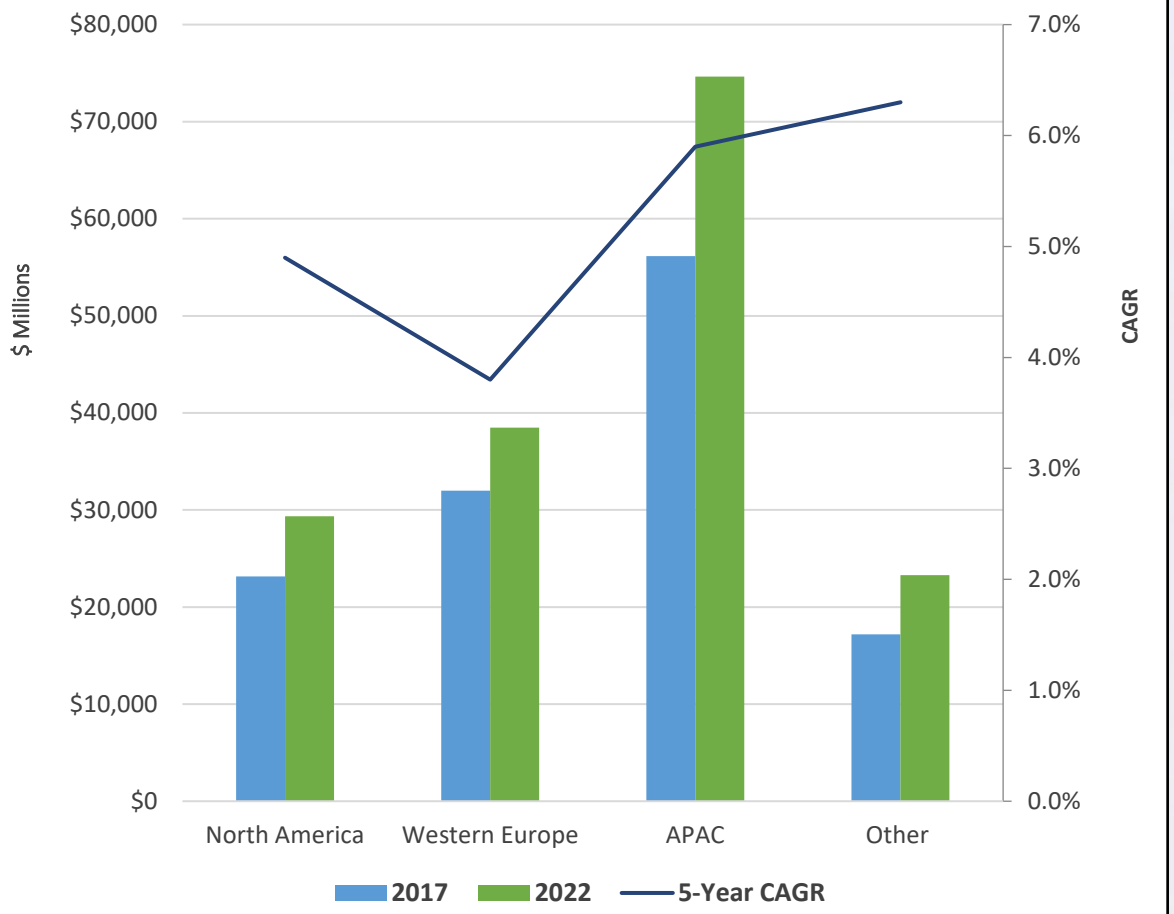


Figure 7-7: Global Agricultural Equipment Production by Region



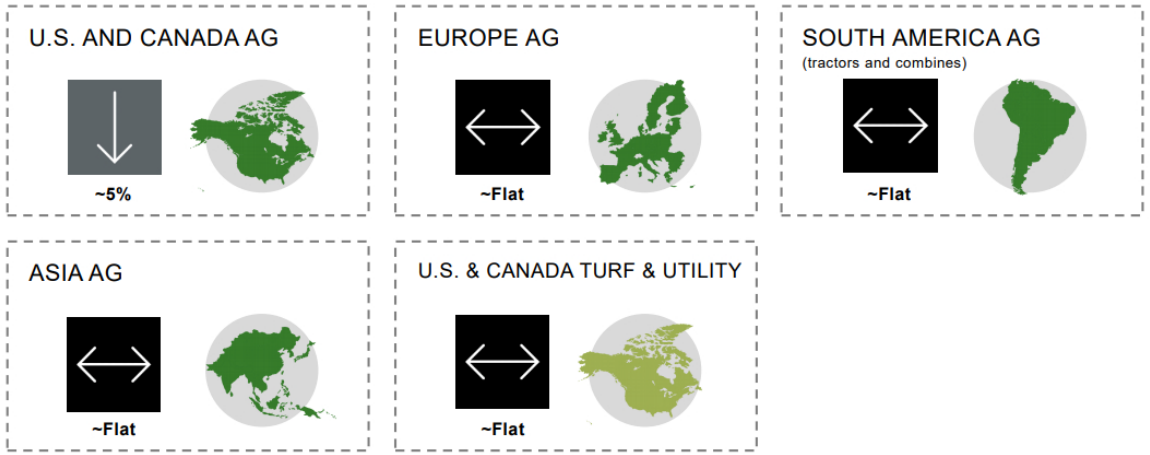
Source: Freedonia

Global End-Use Markets

Overview

- General industrial finishes are used by a very broad category of products from a diverse group of manufacturing industries.
  - U.S. Census defines 14 manufacturing industry classifications with using general industrial finishes.
  - For OEMs, coatings = a very small volume of consumables used during the manufacturing process
- ACE = consistently the primary market, globally and regionally
  - Construction machinery and equipment (largest segment)
  - Farm machinery and equipment
  - Lawn and garden equipment
- Business furniture/IT equipment = lower demand, premium coatings commanding higher average selling prices
  - Non-wood furniture and computer and related electronics equipment (IT) are higher priced, custom colors and smart coatings functionality
- Miscellaneous = small segment
  - Items include metalworking, engines, turbines, shelving, racks, lockers, blinds and shades, lighting fixtures, sporting goods, musical instruments, signage, dumpsters, fasteners, gaskets, etc.

Figure 7-8: Ag & Turf Industry Outlook (FY 2020)



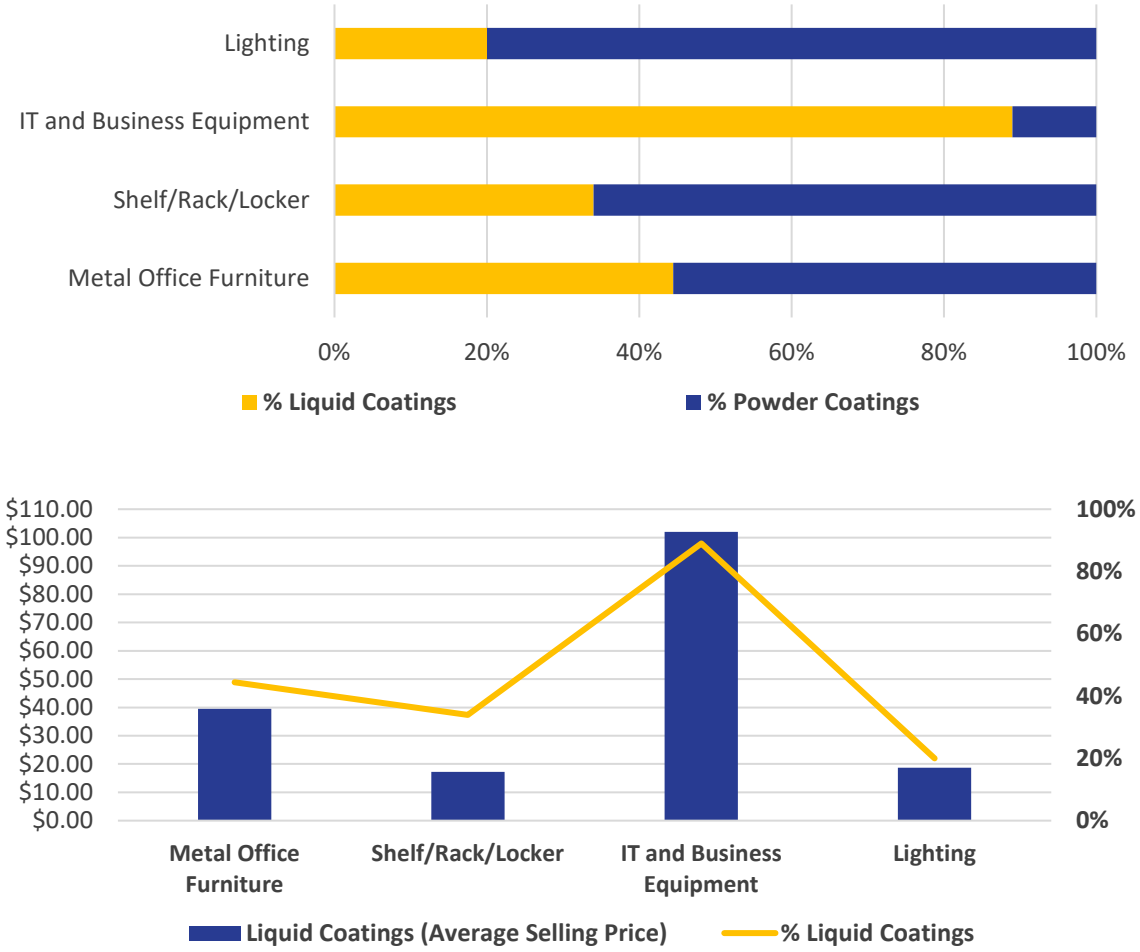
Source: John Deere 1Q20 Earnings Call, The ChemQuest Group, Inc.

U.S. End-Use Markets

Overview

- U.S. finishes are used by a very broad and diverse group of manufacturing industries.
  - Most industries using general industrial finishes: U.S. Census Bureau CIR MA325F and assigned NAICS codes as follows:
    - Audio and video equipment mfg. – 334310
    - Commercial, industrial, and institutional electric lighting – 335122
    - Computer and peripheral equipment mfg. – 334111
    - Institutional furniture – 337127
    - Metal household furniture – 337124
    - Office furniture – 337214
    - Residential electric lighting fixture mfg. – 335121
    - Showcase, partition, shelving and locker – 337215
    - Others, including miscellaneous fabricated metal products – 339999
  - In general, coating products are poorly tracked.
    - For OEMs, coatings = a very small volume of consumables used during the manufacturing process
  - Historically, value of coatings to value of final manufactured product ranges is <2%, with metal office furniture = <1%.
  - Office furniture and IT equipment manufacturers are the most demanding sectors. IT wants a new color every 18 months, slightly longer timeframe for office.

Figure 7-9: U.S. End-Use Value Estimates by Coating Type (2019)



Source: The ChemQuest Group, Inc.

Economic Influences

- General industrial finish demand is highly dependent on the health of the industrial manufacturing sector, which is tied to GDP.
  - Residential and non-residential construction growth = demand for new furnishings, IT equipment, appliances and lawn maintenance equipment
  - Higher consumer spending = more discretionary purchases (smart phones/computers, appliance and lawn equipment upgrades, sports equipment, musical instruments)
  - Some industry sectors are highly vulnerable to volatility in commodity markets.
    - Yield amounts & crop prices = crop value = increase/decline in agricultural machinery/equipment demand
    - Metal prices dictate level of mining and related processing activity.
- China has the largest agricultural and construction markets.
  - China is the largest producer, importer, and consumer of food. U.S. is the largest food exporter (and second largest importer), followed by the Netherlands.
  - China, U.S., and India are expected to account for >50% of the construction growth (2016–2030)
    - In 2017, China's coatings consumption for 9 types of construction machinery = 76,000 tons valued at $290 MM; expected to reach 107,000 tons by Q4 2020 (CAGR = >12%).

Economic Influences

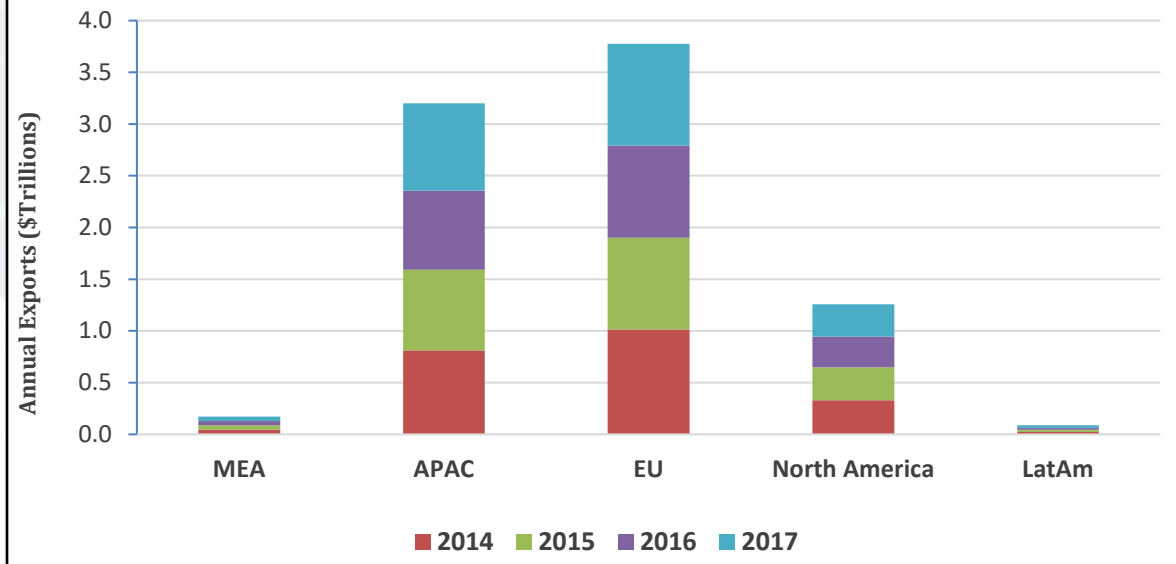
- Spending for non-wood furniture, fixture, and business equipment finishes broadly tracks to construction spending.
  - Although construction spending is the overarching factor, coating demand is directly impacted by combined consumer, institutional, business, and industrial spending.
    - Growth factors: higher housing and commercial construction/renovation rates, low unemployment rates, rising demand for office space, increasing standard of living, expanding hospitality sector, lower interest rates, significant higher demand from millennials
    - The metal office furniture segment has historically been a 12- to 18-month indicator for recessions.
- Technological innovations and consumer trends will influence material choice (sometimes contradictorily) and therefore coating choice.
    - Increased demand for eco-friendly and safer products (including flame retardant properties)
    - Increased global demand for low-cost, lightweight, and durable plastic furniture (with a growing focus on recyclable plastic) instead of wood or metal furniture
      - Countered by consumers who want more than basic functionality, don't see plastic products as stylish or durable, and worry about plastics' overall environmental impact
    - Increased e-commerce industry growth that makes furniture more widely available

Trade Influences

Overview

- End-use trade patterns = most influence on coating market
  - General industrial finishes tend to be manufactured and applied in the region in which the end-use product is fabricated.
  - Tariff wars is impacting trade patterns and could place downward pressure on global product demand.
    - The U.S.-China trade war has hurt U.S. sales of many agricultural products.
    - Some companies are shifting manufacturing from China to other APAC countries, particularly Vietnam.
  - Agricultural sales are a good indicator of the GDP and demand for general industrial finishes.

Figure 7-10: Other Machinery Exports by Region (2014–2017)



Sources: World Trade Organization, The ChemQuest Group, Inc.

Trade Influences

Figure 7-11: Exports of Office/Telecom Equip by Region (Value)

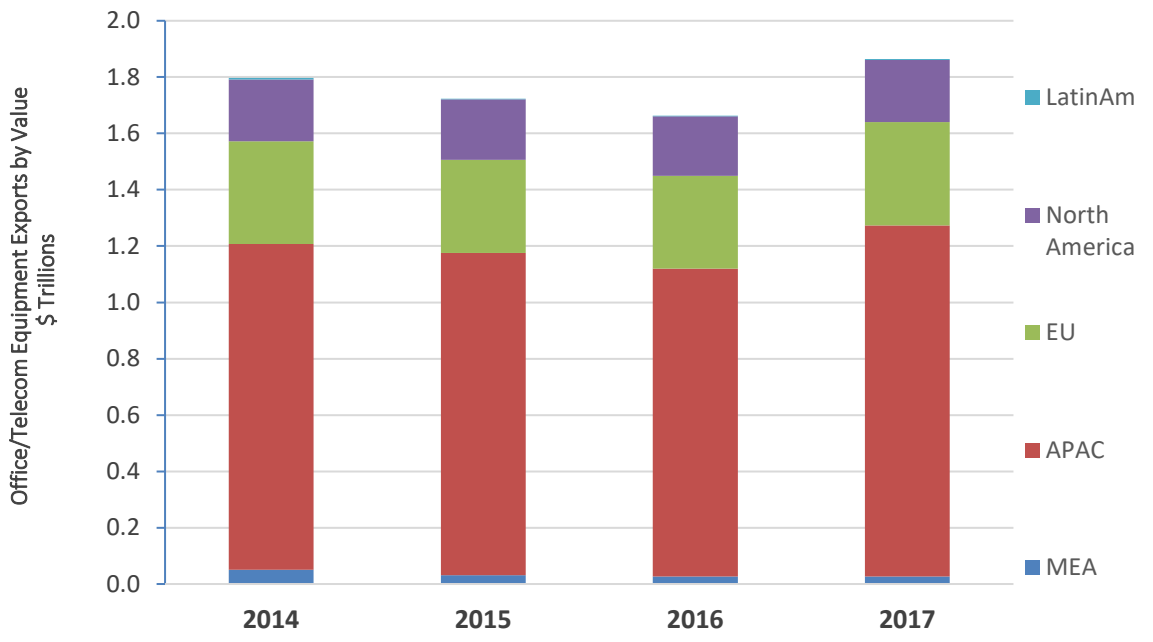
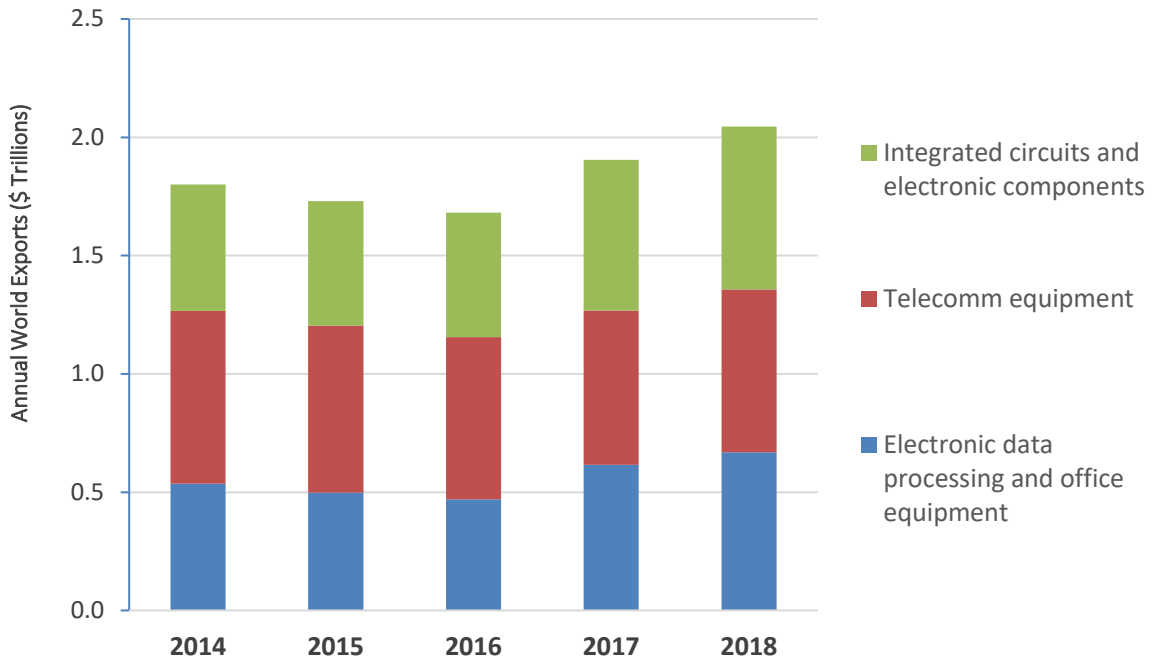


Figure 7-12: Exports of Office/Telecom Equip by Subsegment (2018)



Sources: World Trade Organization, The ChemQuest Group, Inc.

Trade Influences

Figure 7-13: U.S. Imports of Office Furniture and Fixtures by Value

Imports of NAICS 3372--OFFICE FURNITURE (INCLUDING FIXTURES)
Note: Not specifically non-wood

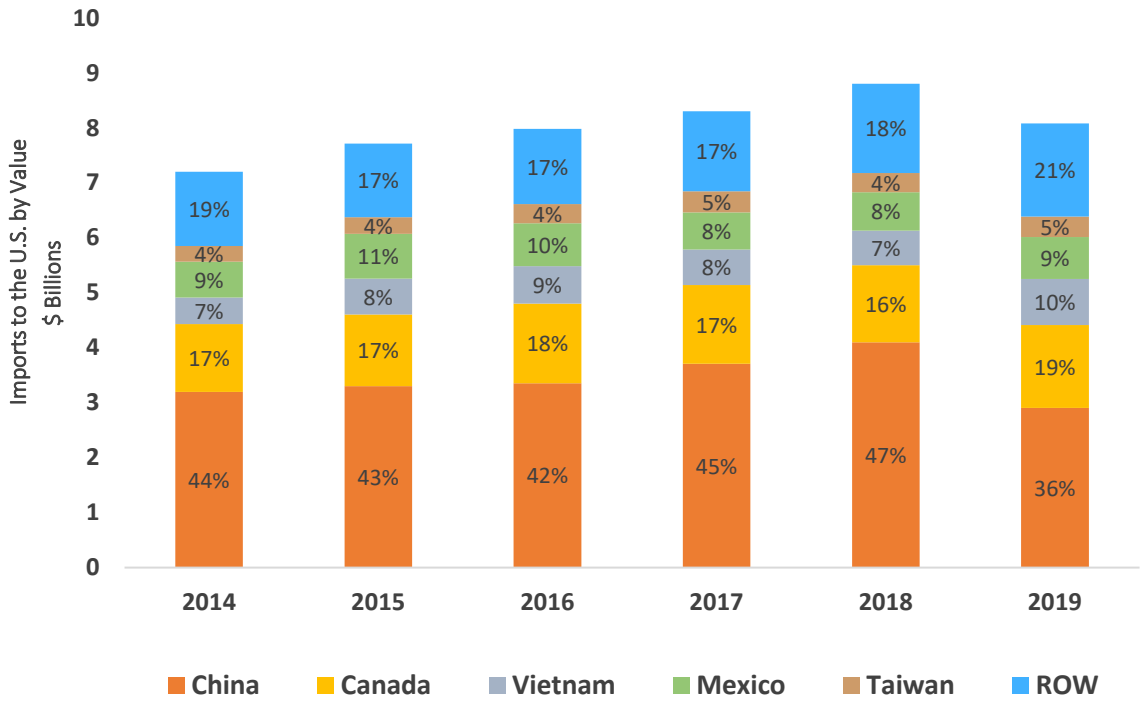
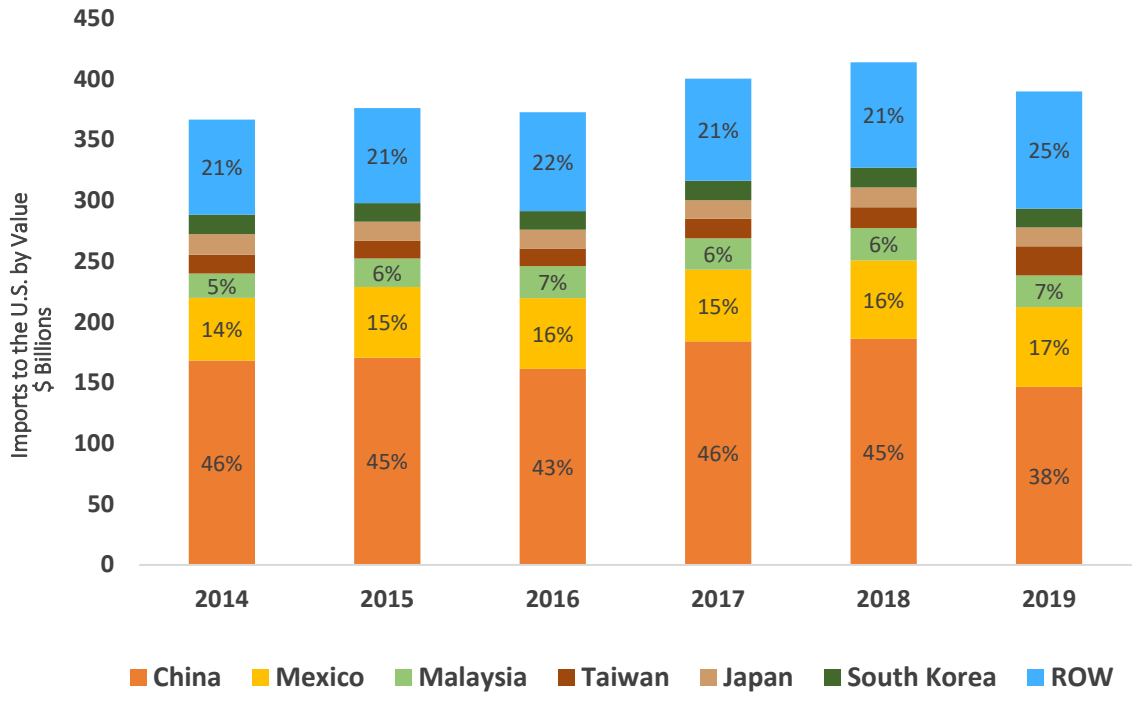


Figure 7-14: U.S. Imports of IT/Electronic Products by Value

Imports of 334--COMPUTER AND ELECTRONIC PRODUCTS



Source: TradeStats Express

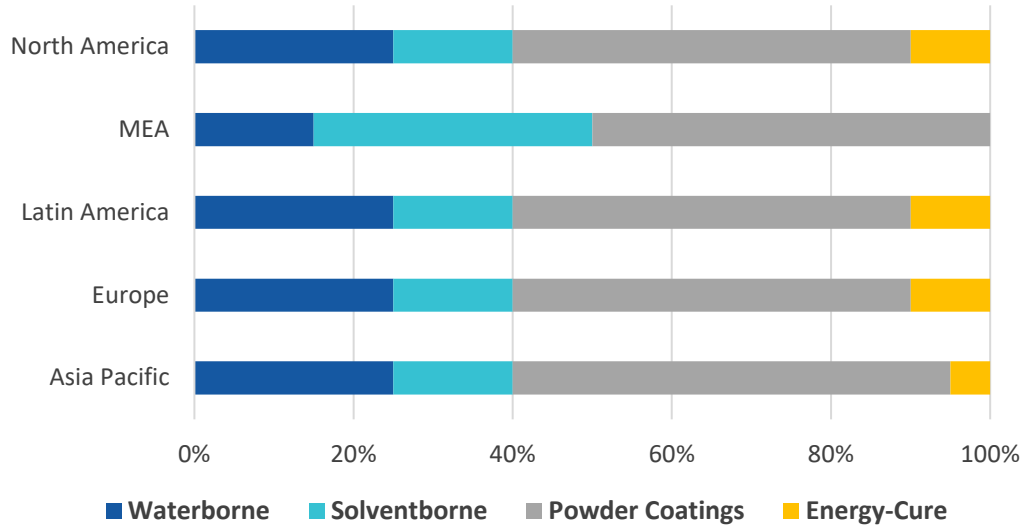
TECHNOLOGY OVERVIEW

Technology Trends and Drivers

Overview

- General industrial finishes are subject to the same technology influences that affect all OEM segments.
  - Trend toward more environmentally friendlier coatings (e.g., powder and waterborne instead of solventborne)
  - However, high-solids solventborne coatings continued to be favored for some heavy-duty applications.
    - ACE manufacturers have invested in abatement systems that mitigate the need for powder or waterborne coating systems.
- Specific technology influences vary by end use, with differing and potentially unique performance requirements.
  - ACE: often subject to harsh operating and environmental conditions (sun, wind-driven rain, snow, ice, hail, temperature extremes)
  - Machine tools & industrial equipment: chemical resistance imperative to protect from aggressive coolants, hydraulic fluids, etc.
  - Non-wood furniture and other lighter duty applications: require more decorative than protective properties

Figure 7-15: Regional OEM Technology Share by Volume (2019)



Source: The ChemQuest Group, Inc.

Technology Trends & Drivers

Overview

- Technological innovations and consumer trends will continue to influence material choice (sometimes contradictorily) and therefore coating choice.
  - Premium coatings for office furniture, IT, in some areas of lighting such as high-reflectance materials, are forecast to continue as value growth leaders
- Increased e-commerce industry growth and interior design marketing to consumers will drive sales in non-wood furniture, fixture, and business equipment.
- R&D efforts
  - Focus on functional coatings and more color options particularly for IT equipment such as phones
    - Functional smart coatings are in demand: color and scratch resistance, anti-fingerprint, anti-glare, anti-microbial, easy clean, anti-reflective and soft touch)
    - Users in IT markets will pay more for these properties = more revenue

Table 7-3: Smart Coatings Forecast (20% AGR)

Coatings Type	Technologies	Impact of Key Applications/End-Use Industries					
		Building & Construction	Food & Packaging	Transportation	Medical	Electronics	Others
Smart Coatings	Anti-icing						
	Anti-corrosion						
	Anti-fouling						
	Self-cleaning						
	Anti-microbial						
	Self-healing						
	Anti-fingerprint						
Polyurea Coatings	Waterborne						
	Solventborne						
Waterborne Coatings							
Anti-microbial Coatings							
UV Coatings							
Powder Coatings							

Opportunity more than $2 billion in 2022

Opportunity between $1 billion to $2 billion in 2022

Opportunity between $100 million to $1 billion in 2022

Opportunity below $100 million in 2022

For details, see ACA U.S. Market Analysis 2019–2024) Chapter 4, New Technology Development and Market Opportunities

Source: The ChemQuest Group, Inc.

FIVE-YEAR FORECAST

Regulatory and Environmental Influences

- Concerns about climate change could lead to tighter regulations, especially related to air quality.
  - Current regulations are often beneficiary to powder as well as waterborne coatings.
    - Powder and waterborne coatings = no or near-zero VOCs = regulatory, environmental, and worker health benefits
    - Anticipating Europe and possibly China will require tin-free formulations (affects e-coat).
  - Regulations + consumer demand regarding energy efficiency and overall lower carbon footprints could further affect machinery, appliance, and other product designs and buying trends, which might affect coating demand.

Key Buying Factors

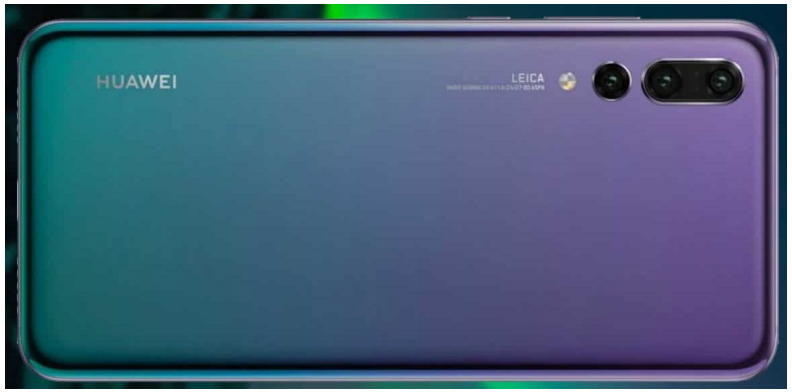
- Buying factors vary by end use, but in general price and performance are the key factors.
  - OEMs are cost conscious.
    - Besides the paint cost, OEMs recognize coatings can be a source of manufacturing, regulatory, quality, and productivity problems. These issues are included in the cost calculation.
  - Many OEMs, particularly ACE and other equipment manufacturers, have high performance requirements.
    - To ensure happy, returning customers, OEMs need coatings that offer desired appearance characteristics, protect their products, and provide low-cost operation throughout an entire product lifecycle.
    - For the manufacturing stage, improving the application and transfer efficiency of coatings is a key issue for OEMs.

Key Buying Factors

Overview

- **Buying factors vary somewhat by application but generally the prioritized evaluation criteria are:**
  - Price: overall metal finishes is a generally cost-conscious market segment in areas such as in shelving, racking and lockers.
    - High-reflectance lighting fixtures deliver energy savings through the coating system; this functionality isn't price sensitive.
    - Overall, coatings cost is an important buying factor in many subsegments despite its negligible contribution to the final product cost.
  - Appearance and durability
    - Furniture and IT customers covet aesthetics (vibrant colors) and durability including scratch and mar resistance, and properties as previously cited: anti-fingerprint, anti-microbial, etc.
      - Smart phones and iPads are redesigned every year, with new color offerings every 18 months; new models typically launch in a 3-year cycle.
    - Some coating manufacturers offer warranties of 12 years or more that is important in office furniture.
  - Ease of application
  - Availability of technical service assistance
    - Delivery services (e.g., just-in-time delivery) and technical service are considered essential supplier attributes.

Figure 7-16: Modern Office Furniture and Phone Colors (2019)



Source: The ChemQuest Group, Inc., SteelCase, GadgetMatch

CONCLUSION

Important Takeaways

- Coating demand projected to increase, but expect it to rise more in value than volume.
  - CAGR (2019–2024 forecast): 3.9% increase in volume; 4.6% increase in value.
  - CAGR: 0.7% increase in average selling price/liter
  - 2024 coatings demand forecast: 6.5 billion liters valued at $22.2 billion
    - General industrial finishes represents broad OEM end-uses ranging from ACE and HVAC equipment to appliances and non-wood furniture; IT equipment, shelving, racks, lockers, and burial caskets.
      - ACE is the primary end-use market, and its sales are a good indicator for coatings demand. North America is the manufacturing leader.
    - Both multinational and regional coating suppliers are significant players in the finishes market.
    - Technology influences vary by end use, with differing and potentially unique performance requirements.
- Coatings market reflects state of industrial manufacturing sector, which is closely related to GDP.
  - APAC has the largest share of global GDP, largest manufacturing industry, and highest coatings consumption.
    - Coatings are applied where products are manufactured, and nearly always produced in the same region.
    - Tariff wars are impacting trade patterns. OEMs are shifting manufacturing from China to other APAC countries.
  - Concerns about climate change could tighten regulations, especially related to air quality.