

CHEMICALINSIGHTS



U.S. Construction Chemicals: Economic Indicators Pointing To Stronger Growth Ahead

The housing crisis has been widely cited as one of the primary causes of the Great Recession. Supported by low interest, "subprime" loans, whose risks were often off-loaded to esoteric (aka "toxic") derivative securities, home values rapidly escalated from 2003 – 2007 in a "bubble" that just as rapidly deflated in 2008 – 2009, nearly taking down the entire financial system with it. The recession may have officially lasted only 18 months, but the housing bust had spill-over effects that caused the recession to be deeper and longer lasting than it needed to be.

Many economists believe that rising home values contribute to a "wealth" effect that causes consumers to increase their spending, but this effect also may work in reverse: falling values cause consumers to reign in their spending. And for some in the wake of the Great Recession, this wasn't just a psychological effect: there was a real loss in wealth. Those who bought at the height of the housing bubble may have later discovered that their mortgage was "underwater," meaning their home was worth less than the value of their mortgage. Their spending then was necessarily constrained, especially so if they had to work at reduced wages or had lost their job. They couldn't, for example, just sell their home and move to another region to take a new or better paying job. As a result, the lingering recession in housing, and construction in general, acted more generally as a brake on the subsequent recovery.

All of this means that manufacturers and marketers of construction chemicals have been whipsawed in the last decade. "Construction chemicals" most generally are considered to be chemical products that are consumed on-site in the construction process. They consist of a mix of both commodity and specialty chemicals that include paint and coatings; adhesives, caulks, and sealants; concrete and asphalt additives; grouts and mortars; polymer flooring; spray foam and insulating materials, and other on-site building materials. IHS Chemical has estimated that the value of the global market for construction chemicals is about \$34 billion, with North America accounting for 15% of the total, or about \$5.1 billion. These numbers may underestimate the size of the market for construction chemicals if you take into account the



construction industry's "off-site" impact on chemical production, as the market estimates don't include the value of related products that are closely correlated with construction, including chemicals used to manufacture durable goods such as carpeting (synthetic fibers), furniture, fixtures, and appliances (coatings, adhesives, and finishes); as well as consumables like cleaning products and maintenance/repair products.

2010

556.9

252.3

2011

535.7

252.6

2012

574.4

276.1

2013

577.1

329.2

2014

630.8

374.9

2015

672.2

440.3

2016

700.1

464.3

Figure 1: Total U.S. Value of Construction Put in Place (2007 - 2016)

2007

637.5

499.7

2008

710.7

366.7

2009

651.0

255.5

Source: U.S. Census Bureau

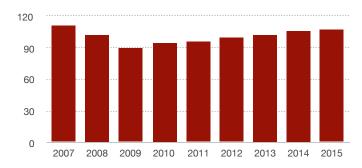
Non-Residential

Residential

Although the recession ended in June 2009, construction spending kept declining through 2011 (Figure 1). Between 2007 and 2011, annual residential construction spending fell by almost 50%, from \$500 billion annually to \$253 billion. Non-residential spending – which includes not just buildings but also infrastructure such as highways and bridges – fared better and actually increased in 2008, but fell in the following three years, from \$711 billion in 2008 to \$536 in 2011, a 25% decrease. The economic impact of this decline on construction chemicals is difficult to quantify, but we get a sense of its effects through market volume indexes published by the American Chemistry Council (Figure 2). The volume index shows a decline of 19% from 2007 to 2009, followed by slow recovery through 2015.

Although the construction and construction chemicals markets are recovering, the strength of the recovery has been comparatively lackluster. But it also has been unusually prolonged: as of June 2017, it has been eight years since the recession ended, almost three years longer than the average length of post-WWII economic expansions.¹ The question then becomes what to expect next: will the weak expansion in the construction industries continue to limp along or sink into another recession? Or, can we expect stronger growth that finally carries us past pre-recession levels?

Figure 2: Construction Chemicals Market Volumes Index 2012 = 100



Source: American Chemistry Council

We believe that the probability of a recession in the near term is quite low. Historically low interest rates continue to provide a floor for construction activity and the economy in general, and the Federal Reserve Bank has signaled it will be slow to raise rates. Virtually no economist is forecasting an imminent recession, and we shouldn't expect an economic downturn until after a sustained period of monetary tightening by the Fed (i.e. higher interest rates), probably in response to increases in the rates of wage growth and inflation. Although the Fed has raised its benchmark federal funds rate target four times since the end of 2015, the current range is only 1.00%, -1.25%, still an extremely low range by historical standards.

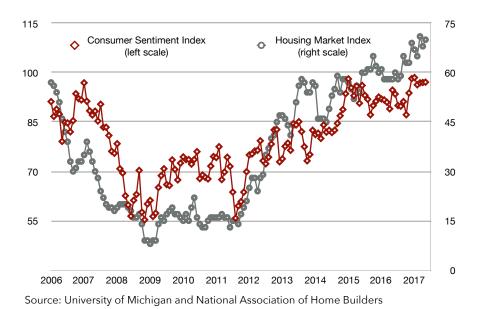
¹ The end of the Great Recession was dated to June 2009 by the National Bureau of Economic Research. The average length of post-WWII economic expansions is 63 months, or five years and one quarter.



There is in fact a reasonable case to be made for a continuation of economic growth over the next few years, with construction and construction chemicals at the leading edge of this trend. The brightest prospects for growth are in residential construction, where a growing number of indicators provide hopeful signs for strong growth in the near term. Growth in non-residential construction is likely to present a more tempered picture, with forecasts taking into account that this segment has already experienced several years of solid increased activity.

Early indicators of a pickup in growth in residential construction include improvements in consumer sentiment and a corresponding increase in home sales, and movement toward filling a large gap between current and underlying long-term demand in new housing starts. Figure 1 shows that residential construction spending has already had a fairly healthy surge since 2012, averaging nearly 13% per year. Some moderation in growth going forward might be expected, but we note that new residential construction is still below its pre-recession 2007 level while the total U.S. population has grown by nearly 8% and the number of households has increased by 7%. The disparity indicates that there may be pent-up demand for new housing, and as a result, some analysts are forecasting a continuation of double digit growth for residential construction spending in 2017, with the construction industry research firm Dodge Data & Analytics projecting a 12% increase in construction spending for single family homes.

Figure 3: Consumer Sentiment and Housing Market Indexes 2006 - 2017



The data on consumer sentiment and the housing market supports an optimistic forecast. The Consumer Sentiment Index, a monthly statistical measure of individuals' feelings regarding their own personal financial situation as well as the shortand long-term growth prospects of the economy, is near its highest level in over a decade.² The Index has a high correlation with the Housing Market Index, which measures home builders' opinions on the relative strength of single-family home sales.3 Both indexes (Figure 3) show relatively steady growth over the last five years, which has translated into healthy growth for housing starts and new home sales. As of April 2017, housing starts were averaging an annual run rate of about 1.2 million units, just over half of the 2.0 - 2.2 million annual unit run rate during the peak of the housing boom in

2005-2006 (Figure 4). The American Chemistry Council has estimated that about \$15,000 of construction chemicals are consumed in the process of building a new home, and that the level of long-term underlying demand is about 1.5 million units per year. That means there is an approximate gap of 300,000 units between current housing starts and expected, long-term demand, representing a \$4.5 billion opportunity for U.S. construction chemicals manufacturers.

How real is this opportunity? Absent an unexpected downturn in the economy, we believe that pent-up demand, particularly from young, first-time buyers, could boost spending on residential construction and construction chemicals in the near term. Consider the under-30 members of the millennial generation who came of age during the Great Recession, many of whom found themselves over-educated, under-employed, and often saddled with a large amount of student debt. Household formation, particularly among those in this age group who otherwise would be the prime market for new

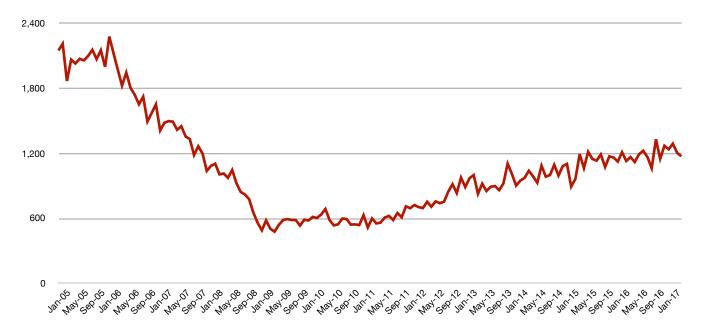
² The Consumer Sentiment Index is published monthly by the University of Michigan, and is measured relative a normalized value of 100 for December 1964. The index bottomed at 56.3 in February 2009 and currently stands at 87.6 (October 2016).

³ The Home Market Index (HMI) is published monthly by the National Association of Home Builders and rates the relative level of current and future single-family home sales. A reading above 50 indicates a favorable outlook and a reading below 50 indicates a negative outlook. After bottoming at 8 in January 2009, the index turned positive (above 50) in July 2014 and currently reads 63.



housing, declined to about 550,000 new households per year in the period 2006 - 2011, compared to an approximate 1.35 million annual rate in the preceding five years - a huge drop by any standard measure. Many millennials ended up living at home longer than they (or their parents) ever expected. But a recent paper published by the Federal Reserve Bank of San Francisco concludes that this situation has turned around and that the number of young adults heading households is now at pre-recession levels. Even though many young adults are still living at home with their parents, household formation appears to have been merely delayed during the recession, and there is a large pool of potential new home buyers. Going forward, household formation is expected to track overall growth of the population aged 18 and over.⁴ Based on Census Bureau projections, that would imply household formations averaging 1.4 to 1.5 million per year between 2017 and 2021, enough to close the gap between current and long-term demand in housing starts.

Figure 4: Housing Starts 2005 - 2017
Seasonally adjusted annual rate, in thousands of units



Source: U.S. Census Bureau

Non-residential construction creates more demand for construction chemicals than residential construction, as it utilizes higher proportions of concrete and asphalt additives; protective coatings and sealers for metal, glass, and concrete substrates; sprayed foam insulation; and other on-site chemicals. Non-residential construction is coming off a few years of solid growth, growing about 9% in 2014 and 7% in 2015. Growth moderated in 2016 to a little under 5%. Consensus forecasts for 2017 and 2018 published by the American Institute of Architects (AIA) are within a range of 5% to 6%, with selected commercial sectors – including hotels, offices, and retail space, poised to grow at an 8% pace in 2017. Growth rates for non-residential construction may not be as strong as housing's, but they are still well above GDP rates and the market is about 50% larger than the housing market. Higher spending on infrastructure, not included in the above estimates, is a priority for the Trump administration and the Republican Congress, and may offer the best opportunity for bipartisan agreement in what otherwise is a highly contentious political environment. The President and Congress haven't yet unveiled an infrastructure plan, so its cost is unknown, but the American Society of Civil Engineers estimates that \$4.5 trillion in investment will be needed through 2025 to fund much needed construction and repairs of highways, bridges, airports and other infrastructure.⁵ If the government can come to an agreement on increased public infrastructure spending, and private spending continues at its forecasted pace, there will healthy demand for construction chemicals through the middle of the next decade.

⁴ See Fred Furlong, "Household Formation Among Young Adults," Federal Reserve Bank of San Francisco, Economic Letter May 19, 2016.

⁵ 2017 Infrastructure Report Card, American Society of Civil Engineers. http://www.infrastructurereportcard.org/the-impact/economic-impact/



Case Study: Henry Company

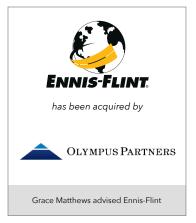
Henry Company LLC is a leading manufacturer of integrated, energy efficient systems that optimize and manage the flow of water, vapor, and air for commercial and residential construction applications. While owned by the private equity group Graham Partners, Henry had grown rapidly to become a leading provider of building envelope products throughout the United States and Canada. Henry differentiated itself from competitors by its innovative technology, strong brands, and focus on delivering comprehensive solutions for the entire building envelope, from the foundation to the roof. Capitalizing on macro trends favoring energy efficient building products, Henry generated over 50% of its sales from products designed to improve a building's energy efficiency, and it had become the #1 or #2 supplier for applications that included air barriers and flashings, roof mastics, liquid applied roofing, and products based on moisture-resistant emulsion technology.

In 2015, Graham Partners engaged Grace Matthews and another leading advisory firm to jointly manage a sale process for Henry. Because Henry was a leader in its markets, and had many opportunities to maintain its rapid pace of growth, we understood that Henry would attract a lot of attention in the marketplace. Grace



Matthews and our co-advisor elected to run a focused auction process, limiting contacts to strategic or private equity buyers that would have the strongest interest in the business, based on either strategic fit or an ability to partner with and support existing management to continue growing the business. Based on meetings and presentations to a number of highly qualified strategic and private equity buyers, Graham Partners selected a leading U.S. private equity firm, American Securities LLC, with which to negotiate a transaction that satisfied the needs of both the shareholders and Henry's management team. American Securities established a partnership with Henry's senior managers to acquire the company and closed the transaction in October 2016.

Recent Grace Matthews Construction Chemicals Transactions















Select Coatings, Adhesives, and Construction Chemicals Transactions: 2015 - 2017

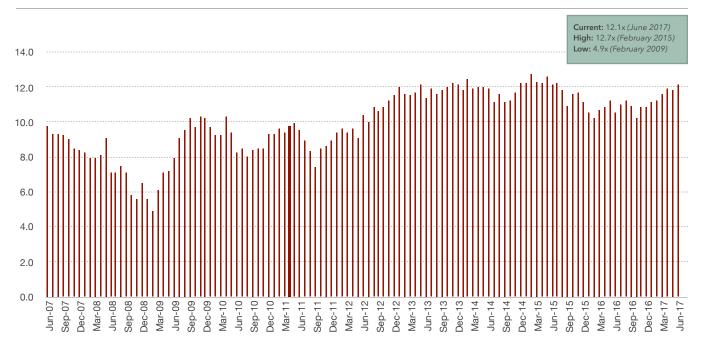
Data	Acquirer / Torret	Towart Description	Enterprise	EV/	EV
Date	Acquirer / Target	Target Description Waterproofing paints, resins, architectural	Value	Sales*	EBITDA ³
Pending	BASF / Pinturas Thermicas del Norte	coatings, concrete improvers, and specialized	=	=	-
		products for the construction industry (Mexico)			
Pending	Kansai Paint / Saudi Industrial Paint Company	Anti-corrosion and construction paints	-	-	
Jul-17	Akzo Nobel / Flexcrete Technologies	Coatings for concrete repair and protection	-	-	-
Jun-17	Dow Corning / Pittsburgh Corning	High performance thermal insulation systems	\$560.0	2.3x	
Jun-17	Sherwin Williams / Valspar	Paints and coatings	\$11,279.0	2.6x	16.2>
Jun-17	Axalta / Valspar's wood coatings business	Wood coatings	\$420.0	1.9x	-
May-17	Beacon Roofing Supply / Lowry's Inc.	Concrete restoration materials	-	-	
Apr-17	Accella Performance Materials / Covestro spray polyurethane foam business	Spray polyurethane foam for construction and insulation applications	-	-	
Apr-17	Firestone Building Products Company / Gaco Western	Waterproofing and insulation products for the construction industry, including coatings, spray foams, and related products	=	-	-
Mar-17	Kansai Paint / Helios Group	Paints and coatings (Austria)	\$608.0	1.4x	
Mar-17	Blair Rubber Company and Hyload / Elastikote	Roofing and waterproofing systems	-	-	
Mar-17	Nippon Paint / Dunn-Edwards	Architectural paints and coatings	\$595.0	1.7x	
Feb-17	Saint Gobain / Adespec Adesivos Especials	Construction and industrial adhesives and sealants (Brazil)	-	-	-
Jan-17	Carlisle Companies / Arbo Holdings	Sealants, coatings, and building envelope products (UK)	-	-	
Jan-17	ParexGroup / Apurva India	Epoxy floor flooring coating systems (India)	-	-	
Jan-17	ICP Construction / Rock-Tred Corporation	Polymer floor coatings	-	-	
Jan-17	RPM / Prime Resins	Specialty chemicals and equipment for infrastructure construction and repair	-	-	-
Jan-17	BASF / Henkel's Western European building materials business	Thomsit and Ceresit flooring adhesive, tiling, and waterproofing products (Germany)	-	-	
Jan-17	RPM (Rustoleum) / Convenience Products Foam Division	Spray-polyurethanes used as sealants primarily in construction industry	-	-	
Dec-16	Sika / Ronacrete	Construction products, including concrete, waterproofing, bonding, flooring, and coating products (Hong Kong)	-	-	
Dec-16	RPM / SPS Group	Architectural paints and coatings (Netherlands)	-	-	
Dec-16	Arkema (Bostik) / Den Braven Sealants	Sealants, foams, aerosols, and adhesives for construction and industrial applications (Netherlands)	\$534.0	1.4x	11.0×
Nov-16	PPG / PPG Univer Italiana (50% JV interest)	Silicone coating systems for architectural and industrial applications (Italy)	-	-	
Nov-16	GCP Applied Technologies / Halex Corporation	Flooring installation products and adhesives	\$47.0	1.0x	
Oct-16	Clements Concrete Company / Low's Ready Mix	Concrete, grouts, flowable fills, sand, gravel, and concrete products	-	-	
Oct-16	Kansai Paint / Sancora Paint Industries	Architectural coatings (Malaysia)	-	-	
Oct-16	Armacell International / PoliPex Indústria e Comércio	Extruded polyethylene insulation foams (Brazil)	-	-	
Oct-16	Teknos Group / Drywood Coatings	Water-based protective wood coatings	-	-	
Sep-16	American Securities / The Henry Company	Roof and barrier coatings, waterproofing systems, cements, driveway maintenance products, and residential building envelop solutions	-	-	-
Sep-16	Sika / FRC Industries	Synthetic polypropylene and steel fibers for concrete applications	-	-	
Aug-16	Synthos / INEOS expandable polystyrene business	Expandable polystyrene products for the building, construction, and packaging industries	\$91.4	-	
Aug-16	DuluxGroup / Craig & Rose's UK paint business	Architectural coatings (UK)	-	-	
Aug-16	GCP Applied Technologies / Sensocrete	Sensors and related software and process controls for concrete manufacturing	-	-	



Date	Acquirer / Target	Target Description	Enterprise Value	EV / Sales*	EV EBITDA
		Custom blended PVC resins for the window,	- value		LUITUA
Aug-16	Wind Point Partners / Aurora Plastics	fencing, siding, decking, pipe, and custom profile extruder markets	-	-	
Jul-16	Tennant Company / Crawford Laboratories	Commercial floor coating systems	-	-	
Jul-16	Mapei / Texzim	Adhesives and construction products (Mexico)	-	-	
Jul-16	General Coatings Manufacturing / Contractors Coating Supply	Roofing coatings, roof sealers, and supplies	-	-	
Jul-16	Saint Gobain / Italcol	Tile adhesives and technical mortars (Albania)	-	-	
Jul-16	Saint Gobain / Demit	Mortars for thermal insulation systems (Slovenia)	=	=	
Jul-16	Saint Gobain / Jaspe Argamassas	Tile adhesives (Brazil)	-	-	
Jul-16	RPM (Tremco) / Duram Industries	Waterproofing products, anti-slip products and	-	-	
Jul-16	HeidelbergCement / Italcementi	floor coatings (Australia) Ready mixed concrete and aggregates (Italy)	\$7,492.1	1.6x	10.5
Jun-16	PPG / Sigma Färg AB	Paints and coatings (Sweden)	\$7,472.1	1.0x	10.57
Jun-16	Florida Paints / Scott Paints	-	-	-	
Jun-10	Florida Paints / Scott Paints	Adhesives, coatings, and paints	-	-	
Jun-16	Olympus Partners / Ennis-Flint	Traffic pavement markings and safety solutions	-	=	
May-16	CRH plc / Technicseal	Polymeric sand and treatment products for the concrete paver industry (Canada)	-	-	
May-16	SOPREMA SAS / Pavatex SA	Wood fiber insulation systems for building envelopes (Switzerland)	-	-	
Apr-16	Huron Capital (Valentus) / Precision Technology' floor finishes business	Floor finishes, including acid-cure floor coating system	-	-	
Apr-16	Innovative Chemical Products Group / Fomo Products	Polyurethane spray foam sealants, adhesives and insulation	-	-	
	FIOGUES	Methacrylate-based specialty adhesives for use in			
Apr-16	IPS Corp / Integra Adhesives	bonding composites, plastics and metals in the	_	_	
, .po	ii o oo,p, iiiogia, tanoonoo	marine, transportation, building construction and			
Mar-16	Accella Performance Materials / Quadrant	product assembly markets Urethane spray foams for insulation market	-	-	
	Urethane Technologies spray foams division	Priming, painting, sealing and finishing products			
Mar-16	RPM (Rustoleum) / Seal-Krete	for maintaining and decorating concrete, masonry, brick and pavers	-	-	
Feb-16	Arizona Polymer Flooring / Super-Krete	Concrete care coatings and sealants	-	-	
Feb-16	Innovative Chemical Products Group / 3M pressurized polyurethane foams business	Polyurethane foam adhesives and spray foam insulation	-	-	
	Huron Capital (Valentus) / National Paint	Specialty coatings used in residential and			
Dec-15	Industries	commercial flooring, industrial protective	-	-	
0 . 15	Innovative Chemical Products Group /	maintenance, pool, marine and other applications			
Oct-15	California Products	Architectural and specialty coatings	-	-	
Jul-15	RPM (Tremco) / Chemtron International	Adhesives, caulks, glazing tapes, mastics, sealants (Canada)	-	-	
Jun-15	Soudal N.V. / TENACHEN SIA	Industrial chemicals, building sealants, insulating glass and construction sealants (Latvia)	-	-	
Jun-15	DuluxGroup Limited / Porter's Paints	Architectural paints and coatings (Australia)	-	-	
May-15	Dominus Capital / W.F. Taylor	Flooring adhesives	-	-	
Mar-15	OMG / ITW Polymers Sealants North America	Elastomeric roof coatings and systems	\$27.4	-	
Mar-15	PPG / Flood Australia	Architectural paints and coatings (Australia)		-	
Feb-15	Nautic Partners / IPS Corporation	Solvent cements, primers, sealants, and components and supplies for plumbing,	-	-	
Feb-15	Arkema / Bostik	construction, and plastic fabrication industries Adhesives and sealants for construction, DIY, and	\$2,234.6	1.1x	11.0
Jan-15	Gemini Coatings / Gulf Synthetics	industrial applications Exterior wood coatings			



Grace Matthews Construction Chemicals Index: Enterprise Value / EBITDA (Last 10 Years)



Source: Grace Matthews & Capital IQ

The Grace Matthews Construction Chemicals Index, a subset of our broader Chemical Index, tracks valuation and performance metrics for 15 publicly traded chemical companies that have a substantial presence in the construction chemicals market. The averages (mean values) presented in the Index are simple averages, which avoids having companies with larger market capitalizations dominating the index, as would be the case if the index contributions were weighted by market capitalization.

Grace Matthews Index: Current Values for Construction Chemicals

	Total Enterprise Value (\$ millions)	LTM EBITDA (\$ millions)	EBITDA Margin %	EBITDA 5 Yr CAGR %	Total Enterprise Value / EBITDA
3M Company	\$135,164	\$8,685	28.6%	21.5%	15.6x
AkzoNobel	\$24,678	\$2,365	15.3%	3.7%	10.4x
Armstrong World Industries	\$3,206	\$232	18.4%	(5.3%)	13.8x
Carlisle Companies	\$6,683	\$725	19.4%	35.1%	9.2x
Compagnie de Saint-Gobain	\$36,598	\$4,173	10.1%	2.5%	8.8x
GCP Applied Technologies	\$2,898	\$215	16.0%	N/A	13.5x
Illinois Tool Works	\$55,907	\$3,618	26.2%	16.5%	15.5x
Kingspan Group	\$6,619	\$430	13.1%	32.1%	15.4x
Masco Corporation	\$14,720	\$1,205	16.3%	(3.2%)	12.2x
Owens Corning	\$9,547	\$1,130	19.1%	19.2%	8.4x
PPG Industries	\$31,555	\$2,552	17.3%	14.5%	12.4x
RPM International	\$9,321	\$665	13.6%	21.6%	14.0x
Sherwin-Williams	\$33,711	\$2,037	16.9%	26.0%	16.5x
Simpson Manufacturing Co.	\$1,882	\$166	18.8%	14.9%	11.4x
USG Corporation	\$4,798	\$514	16.9%	15.0%	9.3x
Mean			17.7%	15.3%	12.4x
Median			16.9%	15.7%	12.4x

As of July 11, 2017



Grace Matthews: Select Chemicals and Materials Transactions











































Grace Matthews Overview

Grace Matthews is recognized globally as a leader in transaction advisory services for manufacturers and distributors throughout the chemical value chain. Grace Matthews' clients include privately held businesses, private equity funds, and large, multinational corporations.

Grace Matthews' practice is global in scope, and focuses on several areas: sell-side transactions and divestitures for private companies, private equity holdings, and multi-national corporations; buy-side work for large public companies, major multi-nationals, and sponsor-backed chemical platforms; leveraged transactions and recapitalizations, strategic advisory analysis, and transaction fairness opinions. Areas of expertise include:

- Adhesives, Sealants, Tapes
- Catalysts, Petrochemicals
- Construction Chemicals, Building Products
- Contract Manufacturing, Custom Synthesis
- Distribution, Equipment, Infrastructure
- Food Ingredients, Flavors, Fragrances
- High Purity, Electronic Chemicals
- Industrial Minerals, Inorganic Chemicals

- Intermediates, Industrial Chemicals
- Lubricants, Lube Additives
- Oilfield & Water Treatment Chemicals
- Paints, Coatings, Inks
- Personal Care, Soaps, Medical Materials
- Plastics, Colorants, Additives
- Tolling, Private Label Products
- Additional Chemical Sectors

Grace Matthews is a privately held investment bank with successful chemical industry transactions dating back to the early 1990s. Grace Matthews principals have completed over 100 transactions involving global corporations such as AkzoNobel, 3M, Lubrizol, BASF, DuPont, Sherwin-Williams, PPG Industries, Ashland, Ceradyne, DSM, ICI, Borregaard, Air Products, Landec Corporation, The Home Depot, Hexion Specialty Chemicals, ITW, PolyOne, Weatherford, and Evonik, to name a few.

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Grace Matthews, Inc. (www.gracematthews.com) is an investment banking group providing merger, acquisition, and corporate finance advisory services for chemical companies both in the U.S. and internationally. Grace Matthews is global in scope and well known for its strong track record of success dating back to the early 1990s.

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