Market Update

Chemicals & Materials

Q1 2018

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Chemical Industry Momentum Continued in Q1, But Raw Material Inflation to Limit Gains

Guest Columnist

Based on economic and industry reports through mid-April, we believe the business environment for the U.S. chemical industry strengthened further during the recently completed first quarter. The U.S. economy continued to grow in the quarter but at a rate expected to have been lower than the average annual rates of 3% estimated for the last three quarters of 2017. The domestic manufacturing sector also continued to expand during the first quarter.

Chemical industry's performance included some adverse impacts from the extreme cold weather conditions in January that disrupted industry production in the Gulf Coast region, the center of the U.S. petrochemical industry. Persistent raw material cost inflation, including for oil and petrochemicals, and higher freight and logistics costs were headwinds for makers of specialty and consumer products. On the plus side, currency exchange rates will be a favorable factor to results for those companies with large overseas operations as the U.S. dollar in the quarter was weaker against major foreign currencies. Companies will also benefit from the first quarter of the tax reform law approved last December which included a permanent reduction in the U.S. statutory corporate tax rate from 35% to 21% starting in 2018

The American Chemistry Council (ACC) reported its Chemicals Activity Barometer (CAB), a leading macroeconomic indicator based on chemical industry data, on a three-month moving average basis, expanded in March for the sixth consecutive month. Production-related indicators in March showed improvement following recent weather-related suppression. Compared to a year earlier, the CAB was up 4.0%.

The global manufacturing sector, the largest customer base for the chemical industry, continued to strengthen during the just completed first quarter, although the growth rate eased over the three months, according to the monthly worldwide PMI business surveys.

The U.S. manufacturing sector also continued to strengthen during the first quarter. According to the Institute for Supply Management's monthly reports for manufacturing activity, U.S. manufacturing activity in March expanded for the nineteenth consecutive month. The reading for February was the highest since 2004. The recent reports indicted tightness for labor availability and in supply chains, and continuing price inflation for raw materials.

The ISM manufacturing monthly reports indicated that the U.S. chemical products industry also expanded in each month of the first quarter. The industry's last monthly contraction was reported for September 2016.

The Federal Reserve Board reported that industrial production climbed at a 4.5% annual rate during the first quarter. Output for the chemicals industry was estimated to have eased 0.8% as output declined in January, likely due to weather related disruptions to basic chemicals and plastics plants. Production jumped 13% for the fourth quarter of 2017 as the industry recovered in the months after Hurricane Harvey.

Several "hard data" points indicate that chemicals production and shipments grew during the first quarter of 2018. According to the Association of American Railroads, the number of U.S. chemicals railroad carloads in the first quarter rose 3.1% from the year earlier period, including a 5.9% rise in March. This follows a 4.4% gain in the final quarter of 2017. For all of 2017, total number of railcars rose 1.2%. Railroads carry about 30% of industry shipments.

Chlor-alkali industry production of chlorine and caustic soda, widely used chemicals, for the first quarter of 2018 were nearly the same as in the year earlier period despite weather related plant disruptions early in the year that reduced output. Plastic resins industry production and sales marginally increased over the first two months of 2018 versus the comparable period in 2017.

Prices for key basic chemicals, intermediates, and plastics averaged higher during the first quarter, mostly due to strong demand and supply disruptions, although prices for some were easing by the end of the quarter.

These higher prices for chemicals products will remain a cost headwind well into 2018 to buyers such as paint and specialty chemical producers as their ability to implement selling price typically lag rising input costs.

Notes:

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The monthly average of a global index of seven widely used petrochemicals, published by S&P Global Platts in March, eased slightly for the second consecutive month from a recent peak in January but was still 6.3% above levels from the previous year.

The domestic monthly contract prices for ethylene, the largest volume petrochemical monomer, declined in February and March with the start-up of new industry capacity, settling about 20% below the recent peak in September that followed supply disruptions caused by Hurricane Harvey. The price on average for the first quarter was almost 10% lower than then fourth quarter and 8% lower than the year earlier period. Ethylene margins narrowed in the first quarter on the lower prices. Spot prices in April were at times at the lowest in years, which may pressure contract prices lower for April.

Domestic prices trends for key derivative plastics were mixed during the first quarter. Polyethylene makers were able to raise prices in February following a smaller decline over the December and January period, but another proposed hike then failed, first for March and then in April on greater industry supply and lower monomer prices. A decline is possible in May. Polyethylene makers include DowDuPont, LyondellBasell, and Westlake Chemical. A price increase in polyvinyl chloride was achieved ahead of the normal spring pickup of construction activity, although further gains will be difficult in the face of lower monomer costs. Vinyl producers include Westlake Chemical, the second largest U.S. vinyl resins producer.

Contract prices for propylene, the second largest volume monomer, pulled back some in both February and March following a rapid run up of about 50% since last summer caused by supply issues. Prices for the first quarter averaged 8% higher than for the previous fourth quarter, which in turned had averaged 18% higher versus the prior third quarter. We expect prices in April to ease again on greater industry supplies. These recent high propylene prices combined with supply issues for other products have resulted in increased prices for derivatives such as resins and solvents to buyers, including paint makers (Sherwin-Williams, PPG Industries, and Axalta).

Chlor-alkali prices have continued to increase in 2018. Caustic soda contract prices have risen over the past two years on stronger domestic demand and record annual exports in part due to capacity shutdowns overseas. Prices continued to rise during the recent first quarter, aided by industry production issues, and we expect more gains for at least the second quarter following additional recent announced price hikes.

Chlorine prices have risen modestly each quarter for the past year as producers achieved portions of proposed price increases. We believe seasonally stronger demand will likely allow producers to again achieve similar gains in the second quarter. Olin Corp. and Westlake Chemical are major chlor-alkali makers.

Titanium dioxide pigment prices and margins have greatly increased globally since bottoming early in 2016 as producers have been able to implement various regional price increases due to stronger industry supply/demand fundamentals, including due to some capacity closures. The slow starts to the U.S. and European paint seasons due to poor weather may limit further price gains for pigments during 2018. The leading producers are Chemours, Venator Materials (the former pigment business of Huntsman Corp.), and Tronox. The higher pigment prices are negatively impacting important users such as paint and plastics makers.

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Digitalization, Chemical Distribution and the Chemical Value Chain – Part I

Till Knorr

Do you still remember ChemConnect, CheMatch, cc-chemplorer and the like? More than 15 years after these companies set out to disrupt the chemical value chain, the topic is back. While most of the then startups have failed (Elemica being the notable exception), today's efforts might fare differently. In our series we focus on distributors who link producers and (usually) small customers. However, some of our thoughts affect the complete value chain.

We start setting the scene for digitalization, then step back a little to discuss some common misconceptions on the role of a distributor, followed by ideas on properly managing the relationship principal/producer vs. distributor. Finally, we come back to digitalization by discussing electronic marketplaces and their impact on the chemical value chain.

Digitalization in Chemicals – Getting rid of distributors for tail-end customers and unknown territories?

When talking about digitalization, disruption is all the rage. Disruption of business models, disruption of value chains, disruption of everything that has to do with customers. So, with all major chemical producers talking about digitalization projects in the range of two- or three-digit millions, disruption of the chemical value chain is already underway. But what will be affected and – focus of our thoughts – is that the end of chemical distribution?

First let's start with the good news for all the companies that produce, distribute or process chemicals. We will continue to live in houses, eat whatever we like (or what an influencer promotes), dress up and use interfaces with the digital world. In our modern world all of that requires chemicals. Hence, whatever digitalization is going to change – chemicals as building blocks or as ingredients that improve performance, safety and durability of things of our physical world are going to last. And thereby its producers as well as processing companies. But what about distributors?

Digitalization will definitely change all processes (and businesses) which deal with information.

Whatever can be digitized, surely will. For the market side of the chemical value chain this translates into direct communication between chemicals processing enterprises (customers) and producers. Whenever a customer's tank or warehouse space runs empty, in a completely digitized world this (already existing) piece of information could directly feed the production (and marketing) plan of the producer, cutting out all the intermediaries, i.e., the chemical distributor. This idea probably resonates well with many a business head who regards distributors as a necessary evil with no other purpose than pocketing the (rightful) margin of the producer.

However, if we take a closer look at the value chain AND at the wishes of the customers, there is more to a distributor than just passing through information:

- Firstly, the distributor not only acts as demand bundler in the above sense towards the producer, rather it bundles the demand for various chemicals/supplies towards the customer. Accordingly, a customer is not interested in getting chemicals from several producers (meaning several deliveries at its warehouse), if he can get them bundled in one delivery from one distributor
- Secondly, the distributor takes care of the physical delivery of the chemicals, if required including repackaging in unit sizes smaller than the producer offers
- Thirdly, with some specialties, the distributor acts as technical "first level support", freeing time of technical sales staff of the principal
- And fourthly, a distributor can and should act as a trend scout and service provider (e.g. customs clearance) in markets too small for a producer/principal to serve. This latter function makes sense, if the distributor is already present in a certain market the principal wants to enter

In a first and quick assessment, the market scout function and the technical "first level support" could indeed fall victim to digitalization:

- Market scout to artificial intelligence which systematically collects all data on a certain market and then comes up with predictions on which sectors will grow at what speed and with which demand of certain machinery, chemicals, financing etc. However, this kind of information will then be available to ALL interested buyers and no longer confined to a one-to-one distributor/principal relationship

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- "First level support" to artificial intelligence and/or augmented reality. In case of problems with the use/application of a chemical, there might be solutions coming up with no human staff involved. E.g. an artificial intelligence interface with search options for solutions of the problem within a huge database of reported problems. Or, if machinery or the like is involved, augmented reality might guide through the problem-solving process

For the two other roles of a distributor in the value chain there is no digital replacement in sight – the bundling of products for the customer and its physical delivery. That's the good news.

The bad news is, there are different players operating in these areas which might qualify as the future winners, hence have to be watched: chemical distributors, (chemical) logistics companies, amazon/Alibaba or similarly powerful internet giants.

We do not reckon incumbent chemical companies as serious competitors in this arena, due to the customer need of bundled deliveries (often more than one supplier) and physical delivery. While the information flow from customers to producers/principals will work seamlessly, the complexity of managing all the product needs in addition to one's own products is going to kill any business case. Especially since the logistics requirements usually differ in size and volume, asking for infrastructure investment at the wrong (tail) end of the customer base.(1)

If a business head of a producer still thinks the chemical distributor a redundant money-grubber, a different understanding of the business model might help. But that's topic of our next piece.

(1) Part III of our series is going to deal with the future of distribution.

The Journal of Business Chemistry – Reading Recommendations

Standardized Cost Estimation for New Technologies (SCENT) – Methodology and Tool

Stanil Y. Ereev and Martin K. Patel

This paper presents the development of a methodology and tool (called SCENT) to prepare preliminary economic estimates of the total production costs related to manufacturing in the process industries. The methodology uses the factorial approach – cost objects are estimated using factors and percentages on the basis of the purchased equipment cost. The chosen approach is based on an extensive literature survey on methodologies and suitable data. The approach has the advantage that it can be based on a limited amount of data (list of equipment required for the technology). Therefore it is especially suitable for new or emerging technologies. The theoretical accuracy of the prepared estimates is within ±30%. Click here to view the full article.

Working Capital Management in the Swiss Chemical Industry

Stefan Seeger, Alwin Locker and Christian Jergen

The performance of Swiss based chemical and pharmaceutical companies regarding their working capital management and its underlying components, namely accounts receivable, inventories and accounts payable differs over time and between the single firms. The calculation of a cash potential for the year 2008 shows that 17 billion CHF is tied up in the companies' balance sheets if they would realize the Swiss best practice performance. It has also been shown that in recent years Swiss chemical and pharmaceutical companies have a considerably higher working capital level compared to their European and US peers. The managerial implications for the achievement of best practice are the awareness of the top management, efficient processes on the operating level as well as an enhanced collaboration within the company as well as throughout the entire supply chain. Click here to view the full article.

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The Founding Angels Investment Model – Case Studies from the Field of Nanotechnology

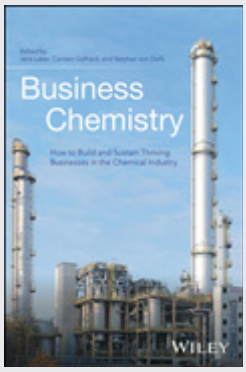
Gunter Festel and Jan Kratzer

The gap between academic research and the commerzcialization of research result can be overcome with the founding angels investment model where very early stage investors found start-up companies together with appropriate research partners to conduct research and later, alone or together with industrial partners, commercialize the results. The engagement of founding angels is compensated not monetarily but through an equity share of the new company. This business model is already being implemented in the United States with some interesting examples in the area of nanotechnology. This article analyzes approach and investment strategy as well as defines a best practice process of founding angels as early stage technology investment model applying an exploratory multiple case analysis. The empirical data are based on literature research with a focus on document analysis and interviews with 35 nanotechnology experts. Click here to view the full article.

Business Chemistry: How to Build and Sustain Thriving Businesses in the Chemical Industry

Jens Leker, Carsten Gelhard, and Stephan von Delft

Business Chemistry: How to Build and Sustain Thriving Businesses in the Chemical Industry is a concise text aimed at chemists, other natural scientists, and engineers who want to develop essential management skills. Written in an accessible style, with the needs of managers in mind, this book provides an introduction to essential management theory, models, and practical tools relevant to the chemical industry and associated branches such as pharmaceuticals and consumer good. Drawing on first-hand management experience and in-depth research projects, the book outlines the key topics to build and sustain business in the chemical industry. It addresses important topics such as strategy and new business development, describes global trends that shape chemical companies, and looks at recent issues such as business model innovation.



Features of this practitioner-oriented book include:

- Eight chapters covering all the management topics relevant to chemists, other natural scientists and engineers
- Chapters co-authored by experienced practitioners from companies such as Altana, A.T. Kearney, and Evonik Industries
- Examples and cases from the chemical industry and associated branches throughout to illustrate the practical relevance of the topics covered
- Contemporary issues such as business model design, customer and supplier integration, and business co-operation

Business Chemistry: How to Build and Sustain Thriving Businesses in the Chemical Industry will be valuable resource to scientists and engineers looking to expand their professional portfolios and enhance their value to their organizations by acquiring essential business management knowledge and skills. It will be of interest to business students interested in a career in the chemical industry or related sectors.

Available at Amazon (click here).

Chemicals & Materials Index

($ in millions, except share price)

Company Name	Share Price	% of 52 Week High	Market Cap	Enterprise Value	LTM Revenue	LTM EBITDA	YoY Revenue Growth	EBITDA Margin	Enterprise Value/LTM Revenue	Enterprise Value/LTM EBITDA
Commodity Chemicals										
Air Liquide	$122.56	89.1%	$52,275	$69,239	$24,145	$5,769	5.6%	23.9%	2.76x	11.5x
Air Products and Chemicals	159.03	90.8%	34,818	35,356	8,697	2,732	12.6%	31.4%	4.15x	13.0x
Braskem	14.52	88.3%	11,677	20,217	13,534	3,023	2.8%	22.3%	1.36x	5.5x
Cabot Corporation	55.72	81.2%	3,444	4,329	2,966	503	17.3%	17.0%	1.53x	8.5x
Formosa Plastics Corporation	3.58	96.3%	22,683	20,919	7,121	1,050	15.1%	14.7%	2.94x	10.1x
Fuchs Petrolub	54.06	84.9%	7,310	7,115	2,964	495	7.0%	16.7%	2.34x	13.3x
K+S	28.73	94.4%	5,499	9,125	4,304	727	4.0%	16.9%	2.04x	12.1x
Linde	200.01	81.8%	37,130	45,624	19,900	4,406	(2.6%)	22.1%	2.16x	10.0x
LyondellBasell Industries	105.68	86.7%	41,697	47,525	35,821	6,864	16.0%	19.2%	1.38x	6.9x
Mexichem	3.06	96.8%	6,426	8,839	6,190	0	12.8%	0.0%	1.40x	7.5x
North Huajin Chemical Industries	1.44	68.8%	2,305	3,767	5,342	652	11.5%	12.2%	0.74x	4.7x
Olin Corporation	30.39	78.2%	5,081	8,496	6,412	1,005	11.1%	15.7%	1.36x	8.5x
Quaker Chemical Corporation	148.13	89.3%	1,971	1,950	837	115	9.7%	13.8%	2.38x	16.8x
SK Chemicals	39.10	47.9%	295	2,866	6,266	216	(5.1%)	3.4%	0.45x	7.8x
Trinseo	74.05	86.8%	3,205	3,972	4,465	522	13.7%	11.7%	0.89x	6.0x
Ultra-Petroleum	4.17	30.7%	819	2,918	804	589	13.9%	73.3%	3.64x	5.0x
Westlake Chemical Corporation	111.15	91.6%	14,385	17,186	8,248	2,005	36.5%	24.3%	2.14x	9.4x
Specialty Chemicals										
A. Schulman	$43.00	98.0%	$1,269	$2,298	$2,617	$192	8.0%	7.3%	0.88x	12.0x
Akzo Nobel	94.54	92.4%	23,938	26,887	11,166	1,168	12.3%	10.5%	2.27x	19.6x
Albemarle Corporation	92.74	64.0%	10,269	11,112	3,172	905	15.7%	28.5%	3.62x	11.6x
Ashland Global Holdings	69.79	54.4%	4,343	6,681	3,566	607	16.8%	17.0%	1.97x	11.8x
Celanese Corporation	100.21	87.9%	13,611	17,075	6,520	1,406	19.5%	21.6%	2.78x	11.7x
Chugoku Marine Paints	9.83	91.7%	644	566	753	51	0.7%	6.7%	0.74x	9.4x
Clariant	23.92	77.4%	7,877	9,621	6,372	852	6.9%	13.4%	1.44x	9.6x
DSM	99.35	93.0%	17,318	18,423	10,570	1,716	9.1%	16.2%	1.73x	12.8x
Ecolab	137.07	97.6%	39,524	46,705	14,147	2,984	7.0%	21.1%	3.38x	15.8x
Elementis	4.15	91.8%	1,924	2,227	783	150	11.8%	19.2%	2.74x	14.3x
Evonik Industries	35.42	87.2%	16,505	20,301	17,158	2,922	9.0%	17.0%	1.14x	7.1x
Ferro Corporation	23.22	91.1%	1,960	2,660	1,482	224	24.7%	15.1%	1.90x	12.4x
Ferrovial	20.90	81.5%	15,254	21,039	14,270	738	4.0%	5.2%	1.40x	14.8x
H.B. Fuller Company	49.73	84.7%	2,513	4,773	2,516	270	18.5%	10.7%	1.90x	17.8x
Hexcel Corporation	64.59	92.9%	5,791	6,541	2,035	464	2.5%	22.8%	3.31x	14.3x
Hitachi Chemical Company	22.83	70.4%	4,754	4,888	6,070	734	20.8%	12.1%	0.80x	5.9x
Kansai Paint	23.33	81.1%	6,003	7,027	3,646	457	21.7%	12.5%	1.95x	14.3x
Kraton Corporation	47.71	89.4%	1,512	3,071	2,005	349	12.5%	17.4%	1.57x	8.9x
Morgan Advanced Materials	4.47	86.8%	1,273	1,582	1,380	190	1.0%	13.8%	1.10x	7.8x
NewMarket Corporation	401.68	83.0%	4,731	5,250	2,245	389	7.8%	17.3%	2.39x	13.4x
Nippon Paint Holdings	36.77	86.4%	11,792	12,191	5,489	947	0.7%	17.2%	2.14x	12.3x
Novozymes	51.63	86.6%	15,092	15,365	2,280	801	0.3%	35.1%	6.40x	18.6x
PolyOne Corporation	42.52	89.6%	3,439	4,506	3,335	377	11.3%	11.3%	1.39x	11.8x
PPG Industries	111.60	91.4%	27,824	30,590	15,050	2,509	1.5%	16.7%	2.07x	12.1x
RPM International	47.67	84.1%	6,372	8,264	5,256	686	7.4%	13.1%	1.60x	12.3x
Sanyo Chemical Industries	46.94	73.9%	1,035	1,059	1,466	186	7.7%	12.7%	0.70x	5.3x
Shenzhen Capchem Technology	3.39	67.7%	1,285	1,278	294	59	11.8%	19.9%	4.42x	20.3x
The Sherwin-Williams Company	392.12	90.1%	36,707	47,023	16,187	2,807	34.4%	17.3%	3.14x	19.2x
Toray Industries	9.48	83.3%	15,158	22,523	19,997	2,368	8.8%	11.8%	1.10x	9.2x
W. R. Grace & Co.	61.23	79.1%	4,129	5,528	1,750	403	7.1%	23.0%	3.22x	13.2x
Wacker Chemie	164.28	75.4%	8,161	8,776	5,841	1,131	4.3%	19.4%	1.45x	7.2x
Diversified Chemicals										
3M Company	$219.52	84.5%	$130,550	$140,489	$32,250	$8,091	6.1%	25.1%	4.44x	15.8x
Arkema	130.59	95.8%	9,904	11,256	9,903	1,673	7.1%	16.9%	1.10x	6.6x
BASF	101.44	83.4%	93,172	108,297	76,251	13,816	6.8%	18.1%	1.36x	7.2x
DowDuPont	63.71	82.7%	148,186	169,571	70,764	13,160	39.6%	18.6%	2.71x	14.2x
Eastman Chemical Company	105.58	93.9%	15,072	21,497	9,853	2,304	8.6%	23.4%	2.25x	9.5x
FMC Corporation	76.57	77.6%	10,297	13,248	3,493	895	38.2%	25.6%	4.60x	21.3x
Huntsman Corporation	29.25	81.0%	7,090	9,669	8,721	1,330	22.9%	15.3%	1.16x	8.0x
Kemira	12.81	83.6%	1,954	2,826	2,959	335	4.2%	11.3%	0.92x	8.2x
LANXESS	76.63	83.2%	7,013	11,217	11,661	1,615	20.1%	13.8%	0.94x	7.0x

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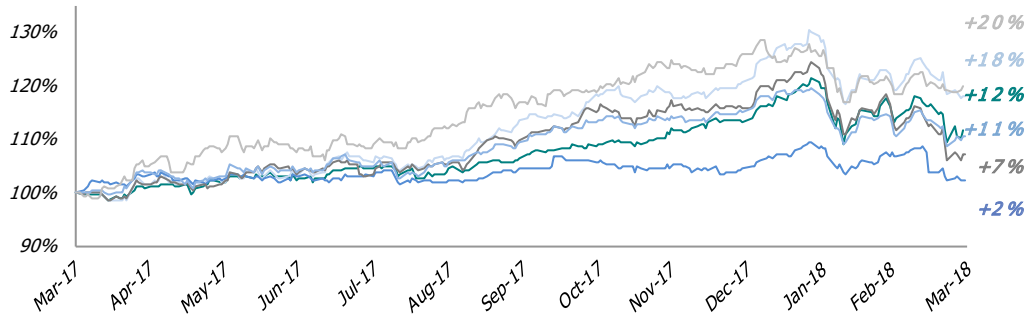
Company Name	Share Price	% of 52 Week High	Market Cap	Enterprise Value	LTM Revenue	LTM EBITDA	YoY Revenue Growth	EBITDA Margin	Enterprise Value/LTM Revenue	Enterprise Value/LTM EBITDA
Mitsubishi Chemical Holdings Corporation	9.70	78.1%	13,966	32,857	33,778	4,607	10.3%	13.6%	0.95x	6.3x
Monsanto Company	116.69	94.0%	51,437	56,518	14,593	4,154	0.8%	28.5%	3.86x	13.7x
Pidilite Industries	14.11	94.5%	7,238	7,009	863	196	4.8%	22.7%	7.75x	34.0x
Solvay	139.03	85.5%	14,351	18,475	12,825	2,361	(7.9%)	18.4%	1.38x	6.5x
Sumitomo Chemical	5.84	70.3%	9,540	19,678	19,824	2,582	11.8%	13.0%	0.96x	6.1x
Ingredients Chemicals										
Balchem Corporation	$81.75	92.4%	$2,619	$2,798	$618	$148	11.3%	24.0%	4.70x	19.6x
Cambrex Corporation	52.30	83.1%	1,722	1,539	571	178	14.3%	31.2%	2.88x	8.8x
Chr. Hansen Holding	86.11	87.3%	11,329	12,125	1,281	425	7.2%	33.2%	9.17x	27.7x
Frutarom Industries	91.92	88.9%	5,473	5,992	1,362	262	14.3%	19.2%	4.43x	22.9x
Givaudan	2,282.07	93.5%	21,017	22,142	5,047	1,020	6.6%	20.2%	4.18x	20.7x
International Flavors & Fragrances	136.91	87.0%	10,804	12,080	3,501	786	10.8%	22.5%	3.55x	16.0x
Sensient Technologies Corporation	70.58	83.1%	3,018	3,613	1,377	265	(0.3%)	19.2%	2.65x	14.3x
Symrise	80.52	88.7%	10,453	12,223	3,555	730	2.3%	20.5%	3.31x	16.1x
Chemicals Distribution										
Aceto Corporation	$7.60	44.4%	$234	$492	$737	$55	27.3%	7.5%	0.66x	6.5x
Brenntag	59.50	85.8%	9,193	11,145	13,936	896	7.8%	6.4%	0.77x	12.1x
IMCD	61.50	86.7%	3,222	3,827	2,269	197	9.7%	8.7%	1.62x	18.7x
Monsanto Company	116.69	94.0%	51,437	56,518	14,593	4,154	0.8%	28.5%	3.86x	13.7x
Nagase & Co.	17.00	83.0%	2,128	2,645	7,110	319	8.5%	4.5%	0.36x	7.9x
Nexeo Solutions	10.70	97.5%	960	1,820	3,895	190	40.2%	4.9%	0.48x	10.2x
Sinochem International Corporation	1.17	58.6%	2,444	6,312	9,331	-	(4.8%)	0.0%	0.85x	12.7x
Univar	27.75	85.3%	3,920	6,347	8,413	604	4.2%	7.2%	0.77x	10.9x
Mean		**83.5%**					**10.8%**	**17.5%**	**2.29x**	**12.1x**
Median		**86.5%**					**8.9%**	**17.0%**	**1.92x**	**11.8x**

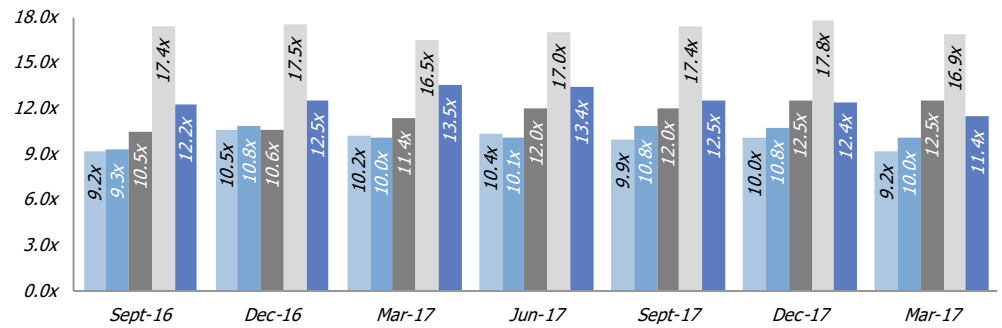
Source: Bloomberg, CapitalIQ and company filings, as of 03/31/2018

- Commodity Chemicals
- Specialty Chemicals
- Diversified Chemicals
- Ingredients Chemicals
- Chemicals Distribution
- S&P 500

Chemicals & Materials Index – LTM Relative Stock Price Performance



Chemicals & Materials Index – LTM TEV / EBITDA Multiples



SOLVAY

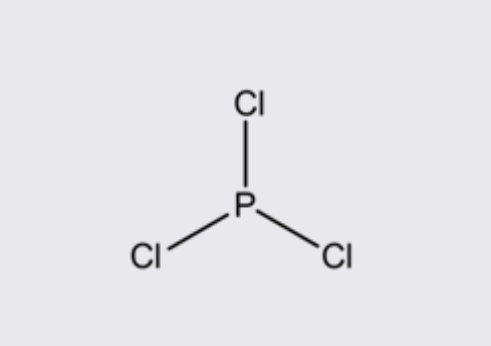
has sold its Charleston, SC facility, and the phosphorus derivatives-based products made at the plant to

LANXESS

Solvay's Sale of its Charleston, SC Facility and Phosphorus Derivatives-Based Products Made at the Plant

Description

Solvay SA, a global chemicals company based in Belgium, has sold its phosphorus derivatives-based products facility (the "Company") in Charleston, South Carolina. The Company is a leading manufacturer of halide and phosphorus derivative-based intermediates used in the production of chemicals for various end-markets. The world-class chemical production facility offers custom-made equipment requiring niche operational expertise resulting in highly-differentiated manufacturing capabilities.



Lincoln Approach & Results

Lincoln suggested a two-step approach: first, Lincoln would contact a select group of six potential, highly-motivated strategic acquirers, and second, if appropriate, continue with a broader process. Lincoln prepared marketing materials that highlighted the business's manufacturing capabilities, efficient production, strict adherence to quality, safety and regulatory standards, management, highly-skilled employees and strategic location.

The Company received three IOIs and two LOIs from highly-interested international strategic acquirers. Lincoln delivered a very successful outcome for Solvay by running a competitive process with two potential acquirers before granting exclusivity. Eventually, the Company was sold to Lanxess AG, a leading German specialty chemicals manufacturer.

FAROL ASSET MANAGEMENT
FULHAM & CO.
BPEA

have sold

DELPHON

to

P / W / P
/ Growth Equity

Sale of Delphon Industries

Description

Farol Asset Management, Fulham & Co. and Brooke Private Equity Associates have sold Delphon Industries ("Delphon" or the "Company"), a manufacturer of proprietary polymer-based applications and specialty tape for the semiconductor and medical end-markets under the Gel-Pak, UltraTape and TouchMark brands. The Company has a global footprint with U.S.-based manufacturing facilities and sales representatives across North America, Europe and Asia. Delphon's products are used to handle complex, fragile and expensive bare die in the semiconductor industry.

Lincoln Approach & Results

Lincoln developed marketing materials which thoughtfully tied Delphon's solution offerings to "super-cycle" demand in electronic technology, while also articulating the Company's unmatched chemistry and material science expertise, premium product offering, defensible market position and strong financial profile. Lincoln ran a robust sale process involving both private equity and strategic acquirers, resulting in over three dozen indications of interest ("IOIs").

After running a highly competitive sale process, Delphon signed a definitive agreement with PWP Growth Equity just six business days after accepting their check-in bid. The transaction closed shortly after filing for expedited HSR regulatory approval.

Lincoln served as a financial advisor for each of the above transactions.

M&A Transaction Recap (Selected Announced Transactions)

Date	Target Company	Target Description	Acquiring Company
Mar-18	Bamberger Polymers	Distributes commodity thermoplastic resins	Plastiche
Mar-18	Naturex	Manufactures natural ingredients for the food and health sectors	Givaudan
Mar-18	Supreme Recourses	Electronics Adhesives Business	Chemence
Mar-18	Gulf Bayport Chemicals	Manufactures specialty anhydride chemicals	MFG Chemical
Mar-18	Solvay Specialty Polymers	Porto Marghera plant in Italy	Alkeemia
Mar-18	MPT Mustard Products & Technologies	Manufactures biological solutions for the agricultural sector	Duport Capital
Mar-18	Passport Food Safety Solutions	Manufactures pre and post harvest products and ingredients	Arm & Hammer Animal Nutrition
Mar-18	PPG Industries, Metal Deco Ink Business	U.S. Metal Deco Ink Business of PPG Industries	Sun Chemical Corporation
Mar-18	RCR International	Manufactures weather-stripping and other building products	M-D Building Products
Mar-18	Datec Coating Corporation	Manufactures ceramic technology based coatings	E.G.O. Blanc und Fischer & Co.
Mar-18	Catalina Graphic Films	Manufactures pressure sensitive materials	Nekoosa Coated Products
Mar-18	Oro Agri SEZC Limited	Manufactures agrochemical and crop protection products	Omnia Group
Mar-18	Hycomp	Manufactures polymers, composite parts and light assemblies	Saint-Gobain Performance Plastics
Feb-18	Grupa LOTOS Spólka Akcyjna	Manufactures refined petroleum products	PKN Orlen
Feb-18	Action Fabricators	Manufactures adhesive tapes and foam products	LTI Boyd Corporation
Feb-18	DUNMORE Corporation	Manufactures coated, metallized, laminated films, foils and fabrics	API Group
Feb-18	United Company RUSAL	Manufactures aluminum and related products	Zonoville Investments
Feb-18	Spectrum, Lubricants Packaging Plant	Manufactures specialty lubricants and other chemicals	Pack Logix
Feb-18	COMPO Expert	Manufactures various fertilizers and agricultural products	Grupa Azoty
Feb-18	A. Schulman	Manufactures plastic compounds and resins	LyondellBasell Industries
Feb-18	TJR Coatings	Manufactures wood coating products	2618249 Ontario Corp.
Feb-18	INFINTIE FUELS	Manufactures biofuels, hydrocarbons and industrial gases	MagneGas Corporation
Feb-18	Dartex Holdings	Manufactures polyurethane coated fabrics	Trelleborg
Feb-18	Certain Assets of M & G Polymers	Polyester resins manufacturing business	The Far Eastern Group
Jan-18	Burke Industrial Coatings	Manufactures liquid stainless steel and antimicrobial industrial coatings	Sierra Corporation
Jan-18	Henkel, Composites Business	Composites Business of Henkel Corporation	Kaneka Aerospace
Jan-18	PLC Corporation	Manufactures anti-freeze chemicals	Imperial Lubes & Supply
Jan-18	Fragrance Design	Manufactures fragrances for body care and household products	Eurofragrance
Jan-18	Foam Fabricators	Manufactures molded and fabricated expandable foam products	Compass Diversified Holdings
Jan-18	Fuel Additive Science Technologies	Develops and blends fuel additives	Millers Oils
Jan-18	Du Roure 7	Organic Fertilizer Production Unit in Donzère, France	FRAYSSINETS
Jan-18	Hexion, Additives Technology Business	Manufactures specialty chemical materials	MÜNZING Chemie
Jan-18	Delphon Industries	Manufactures specialty materials for shipping semiconductor industries	PWP Growth Equity
Jan-18	U-C Coatings Corporation	Manufactures wood protection products	High Road Capital Partners
Jan-18	Crystal Peak Minerals	Manufactures specialty fertilizers	EMR Capital Investment
Jan-18	Mercury Plastics	Manufactures custom thermoplastic extrusions	Masco Corporation
Jan-18	Sea to Sky Innovations	Manufactures water based paint strippers	SOCOMORES
Jan-18	IQAP Masterbatch Group	Manufactures masterbatches of colors and additives for polymers	PolyOne Corporation

Market Intelligence

03/16/2018: Italmatch Chemicals, a manufacturer of specialty performance additives for the lubricant, plastics, water & oil markets owned by Ardian, has mandated Goldman Sachs to explore a potential sale. The company has over €300mm and €50mm of revenue and EBTIDA, respectively.

03/09/2018: Heytex Bramsche, a manufacturer of technical textiles and textile print media manufacturer owned by Deutsche Beteiligungs, has mandated Robert W. Baird to explore a potential sale. The company has over €10mm of EBTIDA.

03/02/2018: Isoltema, a privately held Italian manufacturer of butyl and bituminous sealants, is approaching the next stage of its sale effort, with binding offers due in a month. The company has over €29mm of EBTIDA.

02/27/2018: Hexion, a manufacturer of thermoset resins and related technologies and specialty products owned by Apollo Global Management, is exploring a sale of the parts of the business, including Epoxy and Coating Resins business following a portfolio review. The company has over $360mm of EBITDA.

02/16/2018: Sun Chemical, a manufacturer of specialty chemicals, is prepared to make a transformational acquisition of up to $1bn as it works to expand its global footprint. The company is evaluating a range of targets across all geographies and particularly in the coatings and inks sectors.

02/08/2018: IGM Resins, a manufacturer of specialty chemicals to the UV ink and coating industries owned by Arsenal Capital Partners, has mandated Moelis to explore a potential sale. The company has over €50mm of EBTIDA.

Source: Mergermarket, CapitalIQ, company filings, investor presentations and earnings transcripts

Global Industry Groups

Business Services
Consumer
Energy, Power & Infrastructure
Healthcare
Industrials
Technology, Media & Telecom

Global Locations

Amsterdam
Beijing
Chicago
Dallas
Frankfurt
London
Los Angeles
Madrid
Milan
Moscow
Mumbai
Munich
New York
Paris
San Francisco
São Paulo
Stockholm
Tokyo
Vienna
Zurich

Advisory Services

Mergers & Acquisitions
Debt Advisory
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Special Situations

About Lincoln International

Lincoln International specializes in merger and acquisition advisory services, debt advisory services, private capital raising and restructuring advice on mid-market transactions. Lincoln International also provides fairness opinions, valuations and joint venture and partnering advisory services on a wide range of transaction sizes. With twenty offices in the Americas, Asia and Europe, Lincoln International has strong local knowledge and contacts in key global economies. The firm provides clients with senior-level attention, in-depth industry expertise and integrated resources. By being focused and independent, Lincoln International serves its clients without conflicts of interest. More information about Lincoln International can be obtained at www.lincolninternational.com.

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