



Chemicals & Specialty Materials

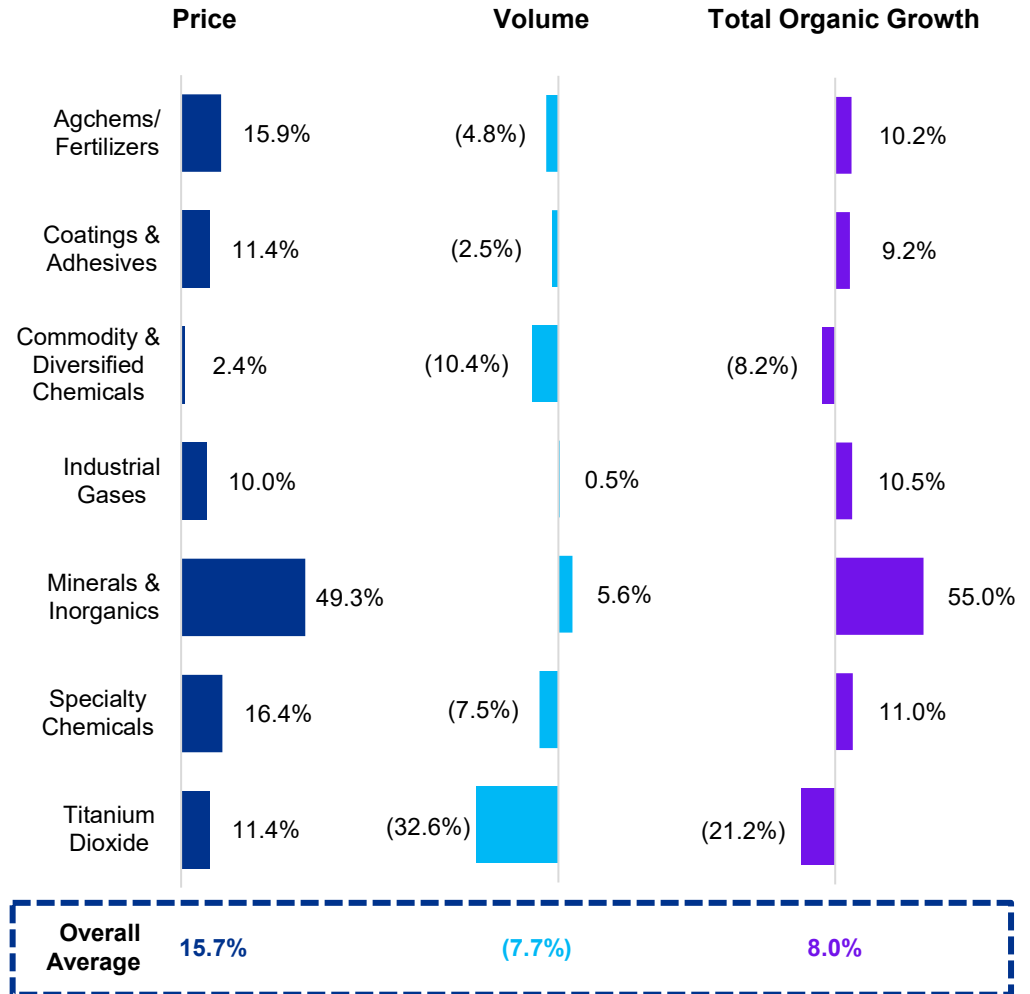
Q4 2022 Price & Volume Trends by Sub-sector

Chemicals & Specialty Materials Q4 2022 Earnings Summary

Given talk of a looming recession, we looked at price and volume trends in the Chemicals & Specialty Materials industry to see how the sector is holding up

- The analysis is focused on public North American companies that disclose price and volume data
- Overall, the industry enjoyed a strong fourth quarter with sales, on average, up 8.0% over the prior year's fourth quarter
- However, looking at the underlying data, it is apparent that the strong top line growth was largely driven by pricing actions (up 15.7% on average)
- Volumes, on the other hand, paint a more troubling picture with more declines than increases. There are likely several reasons for the weak volume numbers including:
 - Inflation and the attendant inverse correlation between price and demand
 - A broader pullback across the economy
 - Anecdotal evidence from conversations with industry participants who've told us their customers over ordered earlier in the year to get ahead of potential supply disruptions only to find themselves sitting on excess inventory
- Even within the industry, there are some sub-sectors worse off than others - it does appear that the more upstream/commodity companies suffered worse than others (e.g. TiO2)
- As for the Minerals & Inorganics companies - Albermarle's Lithium business accounted for a significant portion of the segment's volume growth

Year-over-year organic growth within the chemicals industry



Purple shading indicates price / volume impact for sub-sector below average

Sources: Capital IQ, Company filings



Agchems & Fertilizers

On average, the Agchems & Fertilizers sub-sector observed double digit organic revenue growth driven by price increases and partially offset by lower volumes

- In Q4 2022, the Agricultural Chemicals & Fertilizers sub-sector experienced an average organic growth of 10.2% year-over-year
 - 15.9% average increase in price
 - (4.8%) average decline in volume
- Price increases were passed through broadly across the sub-sector in response to increasing input costs:
 - Increased energy costs associated with the nitrogen and phosphate production process
- As prices increased, volumes fell across the sub-sector
 - The fertilizer segment was hit hard with many players reporting declines in volume suggesting farmers adjusted their buying patterns with concerns over its affordability
 - Agchem players such as Corteva and FMC Corporation fared better than their fertilizer-focused peers likely due to greater demand inelasticity of seed / crop protection products

Company Name	Organic Growth		
	Price	Volume	Total
CF Industries Holdings	13.0%	(10.3%)	2.7%
Ammonia	36.2%	(24.2%)	12.0%
Granular Urea	(9.8%)	1.5%	(8.3%)
Urea Ammonium Nitrate (UAN)	25.6%	(8.1%)	17.5%
Ammonium Nitrate (AN)	27.5%	(1.9%)	25.6%
Diesel Exhaust Fluid, Urea Liquor and Nitric Acid	(9.7%)	(15.8%)	(25.5%)
Corteva	12.0%	(1.0%)	11.0%
Seed	19.0%	(1.0%)	18.0%
Crop Protection	7.0%	0.0%	7.0%
CVR Partners			12.3%
Ammonia	30.0%	(26.7%)	3.3%
Urea Ammonium Nitrate (UAN)	31.0%	(1.5%)	29.5%
FMC Corporation	8.0%	9.0%	17.0%
LSB Industries	32.9%	(6.7%)	26.2%
Ammonium Nitrate (AN) & Nitric Acid	31.1%	(13.4%)	17.6%
Urea Ammonium Nitrate (UAN)	36.6%	(18.6%)	18.0%
Ammonia	39.5%	12.4%	51.9%
Nutrien	Increase	Decrease	3.1%
Potash	13.0%	(14.0%)	(1.0%)
Retail	Increase	Decrease	5.4%
Phosphate	7.7%	(25.3%)	(17.6%)
Nitrogen	18.0%	(11.0%)	7.0%
The Mosaic Company	19.3%	(3.0%)	16.3%
Phosphates	6.8%	(11.1%)	(4.3%)
Mosaic Fertilizantes	18.2%	8.7%	26.9%
Potash	40.3%	(9.5%)	30.8%
The Scotts Miracle-Gro Company	10.0%	(17.0%)	(7.0%)
U.S. Consumer	13.0%	(5.0%)	8.0%
Hawthorne	5.0%	(36.0%)	(31.0%)
Agchems & Fertilizers Average	15.9%	(4.8%)	10.2%

Note: Total organic revenue growth may reflect KPMG estimates based on availability of data.

Source: Capital IQ, Company filings



Coatings & Adhesives

The Coatings & Adhesives sub-sector displayed double digit growth in pricing with slight contraction in demand

- In Q4 2022, the Coatings & Adhesives sub-sector experienced an average organic growth of 9.2% year-over-year
 - 11.4% average increase in price
 - (2.5%) average decline in volume
- Most players in the sub-sector enjoyed significant price increases as a major driving factor for top-line growth year-over-year
- Overall, the sub-sector saw decline in volume across most end-markets largely driven by:
 - Demand from construction market (a major end-market for coatings industry) remained soft, as new housing starts in December 2022 were 25% lower year-over-year
 - Axalta's Mobility Coatings business unit bucked the trend with a strong improvement over 2021, although this was driven, in part, by weak volumes in the year ago period

Company Name	Organic Growth		
	Price	Volume	Total
Axalta Coating Systems	11.7%	2.4%	14.1%
Performance Coatings	11.8%	(4.3%)	7.5%
Mobility Coatings	11.5%	18.7%	30.2%
H.B. Fuller Company	11.4%	(5.0%)	6.4%
PPG Industries	11.0%	(5.0%)	6.0%
Performance Coatings	9.0%	(4.0%)	5.0%
Industrial Coatings	13.0%	(5.0%)	8.0%
The Sherwin-Williams Company	+Low DD%	Flat	10.3%
The Americas	+HSD%	+MSD%	Increase
Consumer Brands	+HSD%	-HSD%	
Performance Coatings	+Mid-Teen%	-Low DD%	
Coatings & Adhesives Average	11.4%	(2.5%)	9.2%

On the architectural side, U.S. housing will be under significant pressure this year. Slowing existing home sales and continued high inflation also will be headwinds. On the industrial side, we have already seen a slowdown in Europe, and the same is beginning to appear in the U.S. across several sectors. In China, COVID remains a factor and the trajectory of economic recovery is difficult to map. The U.S. housing slowdown also will impact some of our industrial businesses, namely Industrial Wood and Coil. Our team is focused on winning new accounts and growing share of wallet in this challenging environment, while leveraging our exposure in more resilient end markets, including residential repaint, property maintenance, auto refinish, and packaging.

- John G. Morikis, CEO of Sherwin-Williams

Note: Total organic revenue growth may reflect KPMG estimates based on availability of data.

Source: Capital IQ, Company filings



Commodity & Diversified Chemicals

The Commodity & Diversified sub-sector had a tough quarter with an overall decline year-over-year

- In Q4 2022, the Commodity & Diversified Chemicals sub-sector experienced an average organic growth decline of (8.2%) year-over-year
 - 2.4% average increase in price
 - (10.4%) average decline in volume
- While the overall sub-sector achieved a slight increase in prices, there were some who experienced significant declines
 - Methanex and Dow saw price declines tied to declines in raw material (crude and natural gas) prices which they passed on to customers
 - Dow called out certain markets (e.g. Siloxanes) that saw increased supply resulting in a decline in prices
- Overall, the sub-sector saw a (10.4%) decline in volume
 - Demand from building & construction and consumer durables market was hit hard
 - A notable exception to the declines was Celanese's differentiated Engineered Materials business

Company Name	Organic Growth		
	Price	Volume	Total
AdvanSix	6.0%	(15.0%)	(9.0%)
Cabot Corporation	18.3%	(4.3%)	13.9%
Performance Chemicals	5.2%	(4.2%)	1.0%
Reinforcement Materials	28.6%	(5.0%)	23.6%
Celanese Corporation	(4.5%)	(6.5%)	(11.0%)
Engineered Materials	17.0%	6.1%	23.1%
Acetyl Chain	(14.0%)	(12.0%)	(26.0%)
Dow	(5.0%)	(8.0%)	(13.0%)
Performance Materials & Coatings	(2.0%)	(13.0%)	(15.0%)
Packaging & Specialty Plastics	(9.0%)	(4.0%)	(13.0%)
Industrial Intermediates & Infrastructure	(1.0%)	(14.0%)	(15.0%)
Eastman Chemical Company	10.0%	(12.0%)	(2.0%)
Advanced Materials	11.0%	(12.0%)	(1.0%)
Additives & Functional Products	12.0%	(9.0%)	3.0%
Chemical Intermediates	5.0%	(25.0%)	(20.0%)
Fibers	26.0%	8.0%	34.0%
Huntsman Corporation	7.2%	(24.9%)	(17.7%)
Polyurethanes	5.0%	(22.0%)	(17.0%)
Performance Products	10.0%	(32.0%)	(22.0%)
Advanced Materials	13.0%	(28.0%)	(15.0%)
Methanex Corporation	(16.2%)	(5.6%)	(21.8%)
Olin Corporation	13.0%		(18.7%)
Chlor Alkali Products and Vinyls	23.3%	(29.0%)	(5.7%)
Epoxy	(3.1%)	(36.0%)	(39.1%)
Winchester	Increase		(18.1%)
Orion Engineered Carbons	Increase	(3.6%)	17.7%
Rubber Carbon Black	Increase	3.1%	28.8%
Specialty	Increase	(21.9%)	(0.9%)
Trinseo	(2.0%)	(21.0%)	(23.0%)
Westlake Corporation	(2.7%)	(3.3%)	(6.0%)
Performance and Essential Materials	(8.7%)	4.7%	(4.0%)
Housing and Infrastructure Products	11.6%	(21.9%)	(10.3%)
Commodity & Diversified Chemicals Average	2.4%	(10.4%)	(8.2%)

Note: Total organic revenue growth may reflect KPMG estimates based on availability of data.

Source: Capital IQ, Company filings



Industrial Gases

Double-digit organic growth for the Industrial Gases sub-sector driven primarily by price increases

- In Q4 2022, the Industrial Gases sub-sector experienced an average organic growth of 10.5% year-over-year
 - 10.0% average increase in price
 - 0.5% average increase in volume
- Positive pricing actions aided growth in sub-sector revenue
 - While costs began to ease towards the end of 2022, players in this sub-sector were still able to sustain momentum of price increases as the sub-sector held pricing discipline
- The sales volume of the sub-sector broadly remained unchanged year-over-year
 - This is a result of steady manufacturing activity year-over-year, despite existing macro-economic headwinds
 - Further substantiated by the December 2022 U.S. Industrial Production Index, which marginally increased by 0.6% year-over-year

Company Name	Organic Growth		
	Price	Volume	Total
Air Products and Chemicals	10.0%	2.0%	12.0%
Linde	10.0%	(1.0%)	9.0%
Industrial Gases Average	10.0%	0.5%	10.5%

The gravity of our business is obviously in China. In China, we did have a weak first quarter, both in volumes and pricing. But we are seeing the economy come back pretty well. The opening with the COVID has helped. And we hope that the bounce back in economic activity will help with getting some pricing trend that we lagged in the first quarter. In Europe, volumes are not that exciting, as you would expect, considering what's going on.

- Seifollah Ghasemi, President & CEO of Air Products and Chemicals

Despite the challenging environment, the Linde team again delivered outstanding performance... This resilient performance is a result of our balanced end market portfolio, unrivaled network density and rigorous capital discipline. This prior year, economic weakness in EMEA and severe weather conditions in the U.S. more than offset growth in APAC and project start-ups. Most of the slower volume came from pipeline customers.

- Sanjiv Lamba, CEO of Linde

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Minerals & Inorganics

Strong demand in a tight market drove overall volume and price in the Minerals & Inorganics sub-sector

- In Q4 2022, the Minerals & Inorganics sub-sector experienced an average organic growth of 55.0% year-over-year
 - 49.3% average increase in price
 - 5.6% average increase in volume
- Within the Minerals & Inorganics sub-sector, lithium enjoyed significant increases in prices and volumes
 - Lithium spot prices rallied significantly and peaked in Q4 2022
 - This rally was driven by continuous rise of demand for EVs in a tight lithium market
- The industrial minerals space also observed a considerable uptick in prices as well as volume
 - Players such as U.S. Silica reported significant growth driven by momentum in Oil & Gas markets

Company Name	Organic Growth		
	Price	Volume	Total
Albemarle Corporation	153.6%	39.2%	193.1%
Lithium	328.0%	82.0%	410.0%
Bromine	9.0%	1.0%	10.0%
Catalysts	10.0%	8.0%	18.0%
Compass Minerals International	15.1%	(5.9%)	9.2%
Plant Nutrition	40.0%	(45.8%)	(5.8%)
Salt	9.9%	2.4%	12.3%
Minerals Technologies	13.2%	(0.4%)	12.7%
Sisecam Resources	33.1%	(15.0%)	18.1%
U.S. Silica Holdings	31.7%	10.2%	41.9%
Oil & Gas Proppants	49.8%	15.2%	65.1%
Industrial & Specialty Products	15.2%	(4.3%)	10.9%
Minerals & Inorganics Average	49.3%	5.6%	55.0%

In our Oil and Gas segment, activity was strong through the holidays, and we did not experience meaningful disruptions from seasonality or weather. The supply and demand balance remained very tight in sand proppant and last-mile logistics, and we continued to be effectively sold-out due to strong well completion demand, especially in West Texas. During the quarter, our customers secured incremental sand supply for the medium term and we signed attractive multi-year contracts that extend into 2024 and 2025, in addition to successfully realizing increased pricing on existing customer contracts.

- Bryan A. Shinn, CEO of U.S. Silica Holdings

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Specialty Chemicals

Strong top line growth driven by increased prices partially offset by volumes

- In Q4 2022, the Specialty Chemicals sub-sector experienced an average organic growth of 11.0% year-over-year
 - 16.4% average increase in price
 - (7.5%) average decline in volume
- The sub-sector reported double-digit price increases on an average driven by passing through rising input costs
- With some exceptions, volumes declined across the sub-sector
- Key factors cited by industry participants include:
 - Weaker demand from China due to COVID-related restrictions
 - Decreased demand across most end-markets due to general economic slowdown
- In addition, customer destocking, particularly in Europe, served as a headwind

Company Name	Organic Growth		
	Price	Volume	Total
Ashland	12.1%	(4.9%)	7.2%
DuPont de Nemours	7.0%	(2.0%)	5.0%
Electronics & Industrial	3.0%	(5.0%)	(2.0%)
Water & Protection		12.0%	12.0%
Ecolab	13.0%	(1.0%)	12.0%
Ecovyst	18.3%	(10.3%)	8.0%
Ecoservices	22.4%	(9.9%)	12.5%
Catalyst Technologies	(2.8%)	(12.4%)	(15.2%)
Innospec			23.6%
Performance Chemicals	18.0%	(5.0%)	13.0%
Fuel Specialties	25.0%	(14.0%)	11.0%
Quaker Chemical Corporation	24.0%	(10.0%)	14.0%
Stepan Company	24.0%	(17.0%)	7.0%
Polymers	14.0%	(23.0%)	(9.0%)
Surfactants	26.0%	(15.0%)	11.0%
Specialty Products		(6.0%)	
Specialty Chemicals Average	16.4%	(7.5%)	11.0%

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Source: Capital IQ, Company filings



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Titanium Dioxide

Significant headwinds driven by significant declines in volume

- In Q4 2022, the Titanium Dioxide (TiO₂) sub-sector experienced an average organic decline of (21.2%) year-over-year
 - 11.4% average increase in price
 - (32.6%) average decline in volume
- TiO₂ players were generally able to increase prices by passing on elevated production costs
 - European energy turmoil in particular, led to higher input costs for TiO₂ manufacturers (e.g. ~78% of Kronos' and ~65% of Venator's manufacturing operations are located in Europe)
- TiO₂ witnessed a steep decline in volumes in Q4 2022 driven by:
 - Considerable softening of demand from key end-market – coatings and plastics – specifically in Asia and Europe. This aligns with the volume declines seen in the Coatings and Commodity & Diversified sectors on page 4 & 5 of this report

Company Name	Organic Growth		
	Price	Volume	Total
The Chemours Company	10.0%	(19.0%)	(9.0%)
Titanium Technologies	7.0%	(35.0%)	(28.0%)
Thermal & Specialized Solutions	6.0%	4.0%	10.0%
Advanced Performance Materials	17.0%	(1.0%)	16.0%
Kronos Worldwide	15.0%	(40.0%)	(25.0%)
Tronox Holdings	8.0%	(32.7%)	(24.7%)
TiO ₂	7.0%	(34.0%)	(27.0%)
Zircon	20.0%	(44.0%)	(24.0%)
Venator Materials	12.6%	(38.7%)	(26.1%)
Titanium Dioxide	8.0%	(44.0%)	(36.0%)
Performance Additives	27.0%	(22.0%)	5.0%
Titanium Dioxide Average	11.4%	(32.6%)	(21.2%)



The macroeconomic environment deteriorated sharply in the second half of 2022 due to significantly lower product demand and higher raw material and energy costs. This presented a material challenge to our business and put pressure on margins, though our Performance Additives segment has been more resilient. We have seen some recovery in TiO₂ sales volumes and believe that destocking in Europe has primarily run its course, though underlying demand remains weak.

- Simon Turner, President & CEO of Venator Materials



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Summary

- The Chemicals industry is a critically important cog in the overall economy given its role as an input supplier across virtually all of manufacturing
- There is historical evidence to show that the Chemicals sector is a leading indicator - a broad decline across the sector foreshadows trouble for the overall economy and conversely, the sector tends to lead the broader economy out of a recession
- Our analysis of fourth quarter organic growth gives cause for some concern
 - While overall sales in the industry grew by a robust 8.0%, virtually all of it came as a result of price increases at the expense of volume
- Volume declines were extremely broad with few exceptions
 - Even companies supplying specialty and differentiated products saw declines
 - And anecdotal evidence from conversations with industry participants indicates that things haven't improved in Q1 2023
- This uncertainty about near term growth is also apparent in the steep decline in sector M&A activity compared to a year ago
- **Overall, we believe the Chemicals & Specialty Materials sector is in for a challenging stretch in the near term – whether this is a short term correction or something deeper and longer lasting, remains to be seen**

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