

SHIFTING VINYL ACETATE MARKET DYNAMICS PRESSURE ADHESIVES

An ongoing series of supply outages, resulting in declarations of *force majeure* and the implementation of sales allocations, coupled with rebounding demand, escalating feedstock costs and international arbitrage opportunities are changing the global vinyl acetate monomer (VAM) market this year. This has tightened supply in North America and led to substantial price increases.

VAM, produced from acetic acid, is an important precursor to vinyl-acetate-ethylene (VAE), polyvinyl acetate (PVAc) and polyvinyl alcohol (PVOH) emulsions used in the formulation of waterborne adhesives. High-vinyl-acetate-content ethylene vinyl acetate (EVA) resin, another VAM derivative, meanwhile, is an important component of hot melt adhesives.

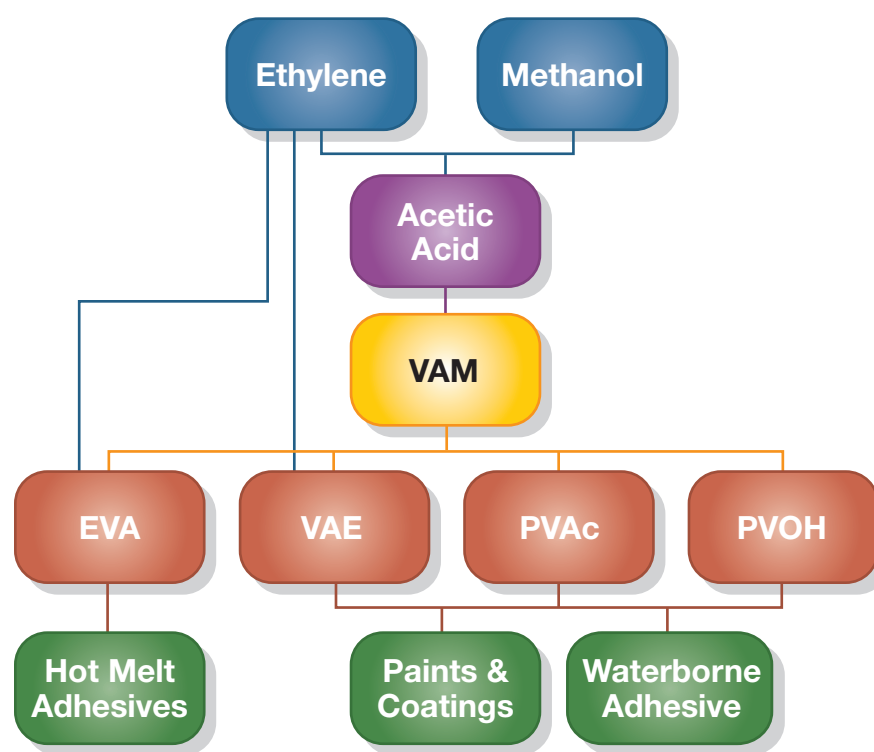
VAM Supply

The majority of North American VAM producers experienced production problems this year. A cold snap in February temporarily slowed output at Gulf Coast VAM plants. Supply stabilized until mid-March when LyondellBasell put customers on 100% allocation following problems at its LaPorte, Texas facility. Supply was further constrained as Dow Chemical's Texas City plant went offline in early April for a two-week planned turnaround.

No sooner was Dow's plant back up and running than Celanese announced a "critical supplier's disruption" that affected its Bay City, Texas plant. The company declared *force majeure* and put customers on 65% allocation.

The bad news kept coming in May. A power outage disrupted petrochemical and refining operations at BP's Texas City complex, forcing the company to declare *force majeure* on acetic acid production. This led Dow to set 100% allocations for contract customers, as its Texas City plant is supplied by BP's operation.

While the North American VAM market is clearly constricted, industry insiders say that the situation remains manageable.



Pricing

The tight supply prodded suppliers to implement price increases in Q1 and Q2. Prices are over 20% higher than in Q4 2010. Now, rising ethylene costs are beginning to contribute feedstock pressure for acetic acid, VAM and derivatives.

Ethylene prices have climbed 25% since the beginning of the year. Three ethylene crackers experienced unexpected outages in April, which shortened supply and inflated prices. "Ethylene producers are practically sold out," Deutsche Bank said in a recent report. The bank expects that with operating rates at around 95%, ethylene will remain tight through May.

The higher input costs are expected to drive suppliers back to the market with additional price increases, possibly as great as 10%, that could go into effect in Q3 2011.

Arbitrage Opportunities

Global supply and pricing dynamics in the acetic acid chain are also in play. These are exerting greater influence over the decisions made by

North American suppliers.

The European acetic acid market has been plagued by a string of supply outages and sales allocations this year. The impact has been more severe than that seen domestically, resulting in very tight market conditions. At the same time, unexpected operational issues with Celanese's Nanjing, China acetic acid and derivatives complex have limited Asian supply. This has increased the demand for American exports.

On top of the strong export pull, North American producers are discovering that they can generate higher margins by exporting VAM and EVA polymers than they can by selling them domestically. The shift of volume to the export market acts to tighten local supply. It also drives prices higher, in effect forcing North American VAM prices to rise to a level comparable to that of VAM produced by higher-cost ethylene from overseas naphtha crackers. According to CMAI, January 2011 vinyl acetate exports to China increased by a factor of eight compared to January 2010 levels.

Outlook

Supply disruptions have become the norm rather than the exception in the acetic acid chain. This is not expected to change. These relentless disruptions have not allowed suppliers to build inventories. Steady domestic demand and a strong export market will maintain the pressure on the North American supply chain. So far the supply situation has been manageable. However, there is no buffer in the supply chain to allow for additional disruptions.

CMAI reports that VAM demand is "very bullish" and supply might not ease until later in the summer. Until then, the supply of VAM and its derivatives will remain taut. High-VA content EVA for hot melt applications is especially short and suppliers continue to implement price increases. Prices throughout the chain are expected to maintain the upward trend and will continue to put pressure on the cost of waterborne and hot melt adhesives. ■

THE RETURN TO REINVESTMENT MARGINS

The companies that supply feedstocks and raw materials to the adhesives industry continued to outperform in the first quarter of 2011. According to the *Wall Street Journal*, profits at America's biggest companies are running 26% higher than a year ago. Similar gains are reported for Europe's largest companies.

There is talk that a new "super cycle" in petrochemicals is beginning. Expanding margins for petrochemicals companies have led to announcements of capacity expansions. The industry appears to be somewhat divided on the news, however. On the one hand, optimists laud company restraint and say that demand growth will continue to fuel the economic expansion. On the other, fears about a rush to oversupply and a repeat of previous boom-bust cycles are leading the more conservative in the industry to advise caution and moderation.

Expanding margins

Rising demand and high prices generated stellar earnings for many chemical companies in Q1 2011. Dow Chemical's

earnings were up 20% in the quarter. The company raised product prices by 12%, more than offsetting the \$700 million increase in feedstock and energy costs.

The story of higher-than-expected raw materials costs being offset by aggressive pricing action was repeated throughout the industry. Tightness in many raw materials markets is fuelling pricing power. However, price increases have not only offset the rise in upstream raw materials prices, they have also expanded margins.

Kurt Bock, BASF's Chairman of the Board of Executive Directors, told analysts that the company is experiencing record margins on some products. "Clearly, those margins won't stay forever," he said. In the near-term, however, he doesn't see any indication nor any significant threat of margin erosion. "Maybe that's a new normal, but that's too early to say."

Adding capacity

Jim Rogers, CEO of Eastman Chemical, explained to analysts in April that much of the supply tightness in the petrochemical

market was due to the severity of the downturn, which forced many companies to shutter or delay expansion plans. Now, demand is outpacing supply in many sectors.

"I can't think of any market that you would consider to be loose," he said. "I think this is probably a trend that the whole industry is going to see going for quite some time."

The persistent market tightness, several quarters of earnings growth, healthy margins and the promise of ongoing pricing power are motivating many companies to announce capacity expansions through debottlenecking and even new construction. Rogers warned that it will take several years before new capacity will come on stream and markets will remain tight in the interim.

There's no denying the tautness of a number of raw materials chains, yet there is some concern within the industry that super cycle euphoria will lead to a rash of investment and eventual overcapacity. Overly ambitious expansion is detrimental to the long-term health of the industry.

In a recent interview with *ICIS News*, Torsten Penkuhn,

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UPDATE: TACKIFIERS REMAIN IN FOCUS

The supply constrictions in the tackifiers market have continued in Q2 2011. The good news is that the cost of Chinese gum rosin has softened slightly, although prices remain at very high levels. This has stabilized the price of natural rosin-based tackifiers. Hydrocarbon tackifiers continue to experience supply issues and higher costs, however.

The largest threat to hydrocarbon tackifier supply continues to be the shift in cracker feeds from heavier, naphtha-based feeds to lighter feeds from natural gas. The light feeds generate less pyrolysis gasoline or "pygas," which is the source of C5 and C9 needed to make tackifiers.

The challenge is that North America is benefitting from abundant new sources of inexpensive natural gas found in shale deposits. North American cracker operators are modifying their facilities to use increasingly greater volumes of this low-cost feed. High crude oil prices, which continue to erode cracker margins, are fuelling this trend and providing cracker operators with even greater incentive to crack lighter feeds. Deutsche Bank reports that ethane feeds accounted for 65% of U.S. ethylene production in April.

While the low-cost feeds are improving the margins for ethylene producers, the trend is also constraining the supply of C5 and C9 available to global markets. This has also increased costs. The price of pygas, the feedstock for both C5 and C9, has climbed approximately 40% since the end of 2010.

"The cost increases we are experiencing as an industry are far larger than we experienced in 2008, when major costs were driven by the rising crude oil," Flint Group's senior vice president, Jan Paul van der Velde told attendees at a National Association of Printing Ink Manufacturers conference in April. "If we thought it was bad then, the current increases are already double that level and there is no light at the end of the tunnel yet." The ink and adhesives industries rely on many of the same rosin-based raw materials.

The demand across industries that use C5 and C9, including adhesives, remains strong. Meanwhile, the potential impact of the recent Japanese disaster on supply is still unclear. A Japanese C5 producer that primarily supplies the road marking industry will be offline for as much as a year. While there is no immediate severe impact on adhesives, as time passes and road marking customers look to source C5 from alternative sources, supply could tighten for all customers.

In addition to providing the feedstocks for C5 and C9 tackifiers, C5 and C9 resins can be processed further to produce hydrogenated hydrocarbon or water-white tackifiers. DCPD, another feedstock for hydrogenated hydrocarbon tackifiers produced through cracking, is also extremely tight. Reduced sales allocations in these types of tackifiers are currently in place. Supply is very tight and is expected to remain so well into 2013.

As a result, the cost pressure on tackifiers, and therefore hot melt adhesives, will persist this year. Demand should remain robust. Several tackifier suppliers have announced capacity expansions, suggesting that margins have returned to reinvestment levels. Some new capacity was scheduled to come on-stream in Q2 2011; additional capacity will be brought online at the end of the year and into 2012. Industry insiders expect that existing tackifier demand will quickly consume the new production, providing only limited relief on the supply side. Prices will continue to climb, at least through the end of 2012, and tackifier suppliers will pass the increased costs on to customers, including those in the adhesives industry. ■

THE RETURN TO REINVESTMENT MARGINS

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the head of BASF's petrochemical business in Asia warned that current overinvestment in Asia could precipitate the next big down cycle.

"We are more and more concerned at BASF about an increasing risk of overbuilding once again," Penkuhn said. "We currently see a risk that people are becoming too ambitious, enthusiastic and optimistic. And that could lead us to where we have already been in this industry." The industry creates its own cycle of overcapacity leading to margin erosion, he said.

Eastman's Rogers is more bullish. "We'll still have some period in the future of overbuild. And we'll have a supply-driven cycle eventually," he said. But the downturn was so dramatic, he said, that the industry is being much more cautious this time around.

"They're not just throwing cash at steel and concrete, and throwing it into the ground," he said. The restraint Rogers sees should bode well for the longevity of the current profitability cycle.

Huntsman is another company that thinks there's room for expansion, especially in Asia. CEO Peter Huntsman said that the company is essentially sold out in Asia, especially in amines, polyurethanes and TiO₂. He explained that the company is fuelling growth in the region through exports from Europe and North America. As those markets continue to strengthen, though, the company will opt to curtail exports and instead supply the local, higher-profit markets, he said. Without adding Asian capacity, markets will continue to tighten as demand picks up and supply issues could result.

"They're getting short today," he said. "It's going to get a lot worse before it gets better."

Boom or bust?

Clearly, petrochemical company margins in many raw materials have returned to reinvestment levels. Companies are responding by investing in new and expanded infrastructure around the globe. This is indeed a repeat of typical cycles, where boom is built on the foundation of the bust that came before.

The question remains whether the restraint observed so far is sufficient to make this cycle different from those of the past. Whether these announcements will manifest as actual capacity that eventually spells the demise of the current cycle—super or not—and lead to price erosion and damaged margins will only be seen in the light of time. ■

WATERBORNE ADHESIVES: SPOTLIGHT ON CORN & CASEIN

Cool, wet weather, flooding, low inventories and steady demand continue to drive up the price of corn in 2011. This is putting pressure on the cost of raw materials used in dextrin-based adhesives. It's also having an impact on the cost of casein, a milk-based protein used in the formulation of specialty labeling adhesives.

Corn

Abundant snowmelt and unusually heavy spring rains have resulted in the worst flooding along the Mississippi River since the 1930s. Millions of acres of farmland in Mississippi, Arkansas, Tennessee, Missouri and Louisiana are inundated, threatening crops in those states.

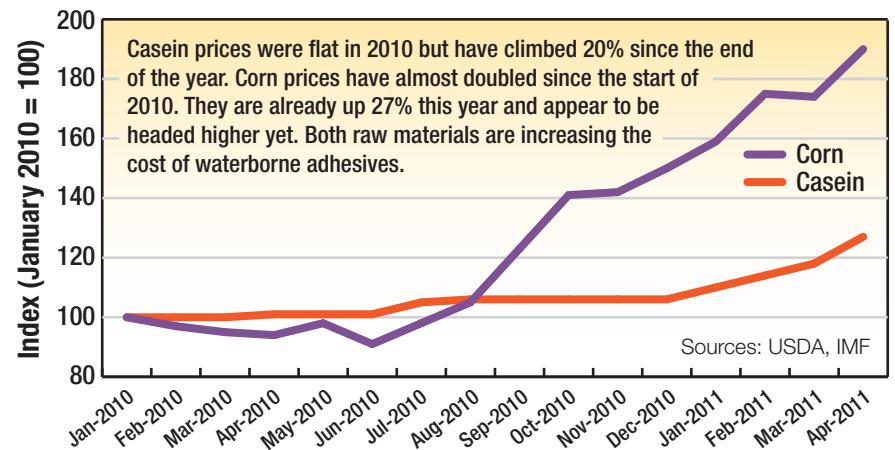
Wet, cold weather also delayed corn planting throughout much of the U.S. Corn Belt this spring. The USDA reports that planting levels lag historical averages for this time of year. June 1st marks an approximate cut-off date for getting corn seeds into the ground. Crop yields decline when planted beyond that date. The planting delay may encourage farmers to switch to soybeans, which can be planted later in the season without impacting yields.

This will become increasingly critical for areas affected by the Mississippi flood waters. Many fields will need to be replanted following the water's retreat but it could take several weeks before fields have dried out enough to be worked. By that time it will most likely be too late to plant corn. This has the potential to reduce this year's corn crop, which would support higher prices.

Corn prices have climbed steadily since last June propelled higher by a disappointing harvest in 2010 and strong global demand. Prices rose over 50% in 2010 and are up an additional 27% already this year.



Raw Escalation



Casein

Rebounding demand, slowing supply growth and rising input costs have caused global milk prices to double since hitting lows in 2009. Escalating feed costs, driven by rising corn prices, and the strong increase in energy prices are now making it increasingly expensive to produce each gallon of milk.

Dairy demand is back to pre-recession levels. A lack of confidence in Chinese milk products has led the way to a substantial increase in dairy imports into China this year. And emerging economies continue to increase their dairy consumption.

At the same time, floods in Australia, dry weather in New Zealand and a cold European winter have slowed global growth in milk production. According to a recent Rabobank report, lower New Zealand milk supply resulted in a 15% drop in Q4 exports of casein.

When milk supplies tighten, casein production is the first to be constrained as available milk supply is diverted to products that are in high demand or generate stronger returns. In Europe, a strong demand surge for cheese is channelling milk supply away from other end markets, including casein. This is a problem for North American casein buyers. With no domestic producers of casein, most casein used in the U.S. is imported from Europe.

All of this has slowly moved casein prices higher this year. Action by the Indian government spurred a recent price spike. Demand for milk in India, the world's largest milk producer, is outpacing supply and leading to rapid domestic price inflation. In response, the Government of India's Directorate General of Foreign Trade prohibited the export of milk powders, casein and casein products beginning in February. The move tightened global casein markets and immediately precipitated announcements of price increases from suppliers.

Casein prices have climbed 20% already in 2011. This increase is putting upward pressure on the cost of specialty labeling adhesives. ■

