

CELANESE FORCE MAJEURE: IMPACT ON ADHESIVES

ACETIC ACID OUTAGE PUTS PRESSURE ON SUPPLY CHAIN

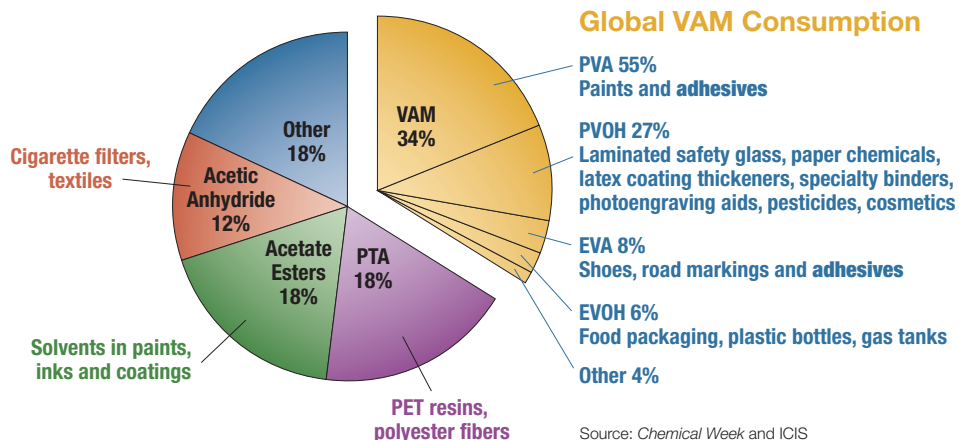
Acetic acid and derivatives markets were thrown into turmoil in mid-June when Celanese Corporation, the world's leading supplier of acetic acid, announced that it would extend *force majeure* on chemicals produced at its facility in Clear Lake, Texas.

Acetic acid is an important precursor chemical to many of the raw materials used by the adhesives industry. It is a versatile chemical that is also used in the manufacture of textiles, paints and coatings, inks, paper, PET resins, and polyester fibers. The problem is that global supplies of acetic acid and its derivatives were already tight before the outage. Demand is strong, and the new shortage is increasing competition among diverse markets, including adhesives, for available supplies.

Limiting Supply

In May, Celanese declared *force majeure* on acetic acid production from

INTERMATERIAL COMPETITION Global Acetic Acid Consumption



The adhesives industry is not the only market competing for limited supplies of acetic acid and its derivatives. The recent decrease in supplies will only intensify competition for the chemicals and drive prices higher.

its Texas facility after the discovery of a quarter-inch hole in one of the plant's reactor vessels shut down production. The facility represents 40-45% of the U.S. supply (10-15% of global supply). As a result, markets for acetic acid, and

key derivatives used in the adhesives industry, tightened significantly. Celanese has been unable to repair and restart its plant and, on June 12, extended the *force majeure* to derivatives of acetic acid and put customers on stricter allocation. The company does not expect to resume sustainable operations until mid-July, at the earliest. It will then take several months to refill the acetyl chain pipeline.

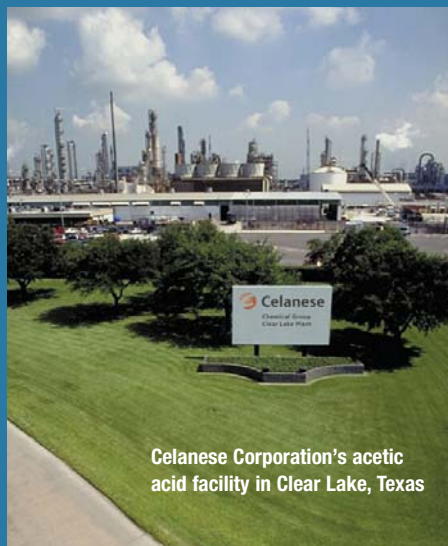
These developments have disrupted markets, and many acetic acid customers are now seeking alternative supplies.

Market Dynamics

North America is hardest hit by the outage, but this situation will have an impact on the global adhesives industry. The global market for acetic acid has fluctuated between balanced and tight leading into Q2 2007. Tightness in the market eased slightly with the smooth ramp up of Celanese's Nanjing, China, acetic acid plant. The plant, which represents 6% of global capacity, wasn't supposed to come

CELANESE OUTAGE: WHAT WE KNOW

- Unplanned outage on May 14 at Celanese Corporation's Clear Lake, Texas facility
- Declaration of *force majeure* on acetic acid takes >40% of North American capacity offline
- Celanese puts customers on allocation (they are only allowed to purchase a fraction of their average consumption for the past 9 months)
- The company expected operations to resume by the end of May
- Attempts to repair the facility were unsuccessful upon restart on June 12
- Celanese extends the *force majeure* to acetic acid derivatives, including VAM, EVA emulsions, PVA and PVOH
- Reduced allocations are reported in the press
- The company expects to resume sustainable operations by mid-July
- Domestic acetic acid suppliers are being swamped with new orders
- Several global suppliers of acetic acid have maintenance outages scheduled for later this summer



Celanese Corporation's acetic acid facility in Clear Lake, Texas

on line until early 2008 but is now operating at full capacity. As a result, spot prices in Asia came off recent highs but are still holding at record high levels. And producers are forecasting a favorable supply/demand balance through to 2008.

Vinyl acetate monomer (VAM) is the largest derivative and accounts for 34% of acetic acid consumption. VAM is a critical precursor chemical to raw materials used in the formulation of liquid adhesives, including polyvinyl alcohol (PVOH), polyvinyl acetate (PVA) and ethylene-vinyl acetate (EVA) emulsions. EVA in the solid form is also an important raw material used to produce packaging hot melt adhesives.

The current shortage is exacerbating an already tight VAM market. A global string of plant outages, along with the shortage of acetic acid, have kept VAM supplies tight. According to *ICIS news*, traders report a 60-70% jump in spot acetic acid prices in the U.S. Gulf Coast following the recent announcement, and VAM prices in Asia reached two-year highs in early June.

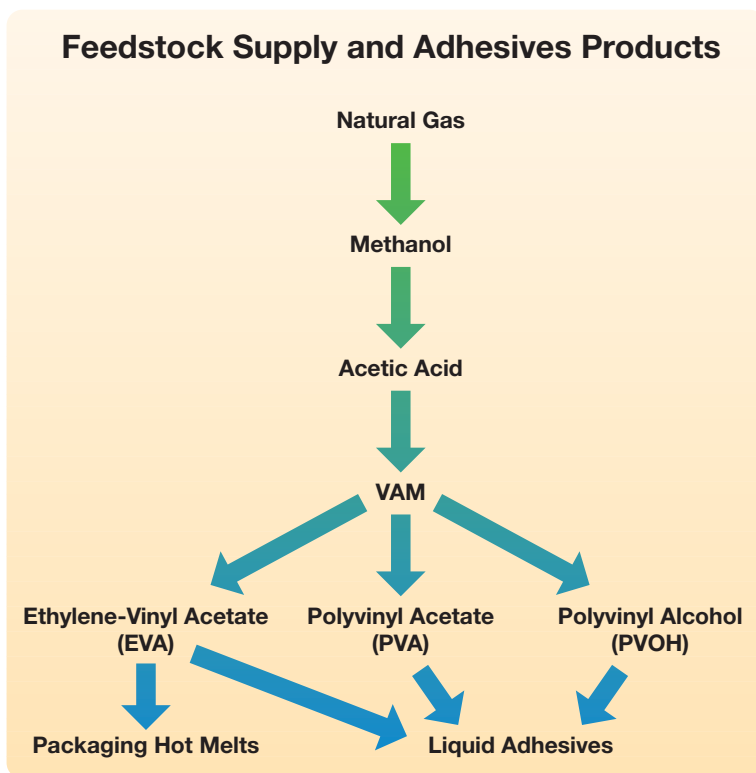
VAM prices were already high as they were still working off the Q3 2006 spike in methanol (the feedstock for acetic acid) prices. This is because many raw materials used in adhesives have longer processing pathways and, therefore, much longer time lags before changes in upstream economics are reflected in their price.

Until Clear Lake comes back on line and the product pipeline is refilled, industry analysts expect we'll see higher prices in the interim. Dow, a major VAM producer, announced a price increase effective June 1, and

Celanese is increasing acetic acid and VAM prices effective July 1. In addition, several global VAM producers have regular maintenance outages scheduled for later this year and are working to build stockpiles to maintain

meaning they can tailor their production to match the needs of their varied customer base. It then becomes another bidding war with plants contracting to produce the EVAs that will be the most profitable. This leads to shoe manufacturers bidding against highway road marking suppliers bidding against makers of packaging film bidding against adhesives manufacturers to secure the raw materials needed to produce their products.

Currently, no suppliers of solid EVA have announced further restrictions to supply. However, limited supply and rising VAM feedstock costs have steadily driven up solid EVA prices 20% in Asia since the beginning of the year. Prices hit all-time highs in mid-June. Recent announcements of EVA price increases in Europe and the U.S. indicate a growing global trend.



supply during the down period. Similar pricing dynamics are affecting all the other acetic acid derivatives used in adhesives.

Competition from Non-Adhesive Industries

There's also the question of competition. As acetic acid supplies tighten, producers may choose to sell product to the highest bidder. In many cases, there are more profitable options than selling to the adhesives industry. Adhesives insiders worry that some VAM producers may be forced to limit production if they can't secure feedstocks.

Hot Melt Impact?

EVA is another raw material affected by this dynamic. Solid EVA manufacturing plants tend to be flexible,

Ensuring Supply

All of these factors are increasing the complexity of managing supply and inventory while the Celanese plant remains off line. The plant is expected to resume full operation by mid-July. Once restarted, it will take several months before derivatives prices stabilize.

In the current supply environment, pricing becomes secondary to securing an ongoing, reliable supply of raw materials. During these times, it is essential to maintain an active dialog with your supplier on inventory levels and demand forecasts. The best insurance for adhesives customers is to seek out suppliers with a solid history of uninterrupted supply — those who have developed the strong relationships necessary to source globally under challenging pricing and supply conditions. ■