

# Raw Materials **FACTS**

## SPECIALTY ADHESIVES, SEALANTS & SURFACE TREATMENTS

### THE FERTILIZER – METAL PRETREATMENT CONNECTION

The prices of raw materials used in the formulation of metal pretreatment products are starting to creep up again. The industry shares many of the same feedstocks, including potash, phosphoric acid and sulfuric acid, with the fertilizer industry. But the fertilizer industry consumes vastly greater quantities of these raw materials. This means that when it comes to pricing, fertilizer prices strongly influence metal pretreatment prices. Fertilizer industry economics can, therefore, provide insight into future supply and demand trends for metal pretreatment feedstocks.

#### Fertilizer Demand

As North American fertilizer companies reported financial results for Q3 2009, it became quickly evident that they were not immune to the impact of the global economic crisis. Fertilizer prices declined, sales were down and customers remained skittish about replenishing inventories.

In response, they curtailed operations, shut down production, laid off workers and did what was needed to contain costs. As a result, inventory declined throughout the supply chain. But just because farmers chose to save costs by not applying fertilizer last year doesn't mean that is wasn't needed. It was. In fact, fertilizer application will be a critical tool in the global fight against rising food prices in years to come.

The demand for food will continue to grow in coming years. And fertilizer is necessary to sustain that growth. A combination of increasing population size and greater economic prosperity in emerging nations is driving the hunger for larger quantities and higher qualities of food.

The problem is that as the global population expands, the amount of arable land available for crops diminishes. This means that farmers must produce more grain on less land, and on increasingly depleted or poor-quality land. The fastest way to do this is to increase yields by applying more fertilizer.

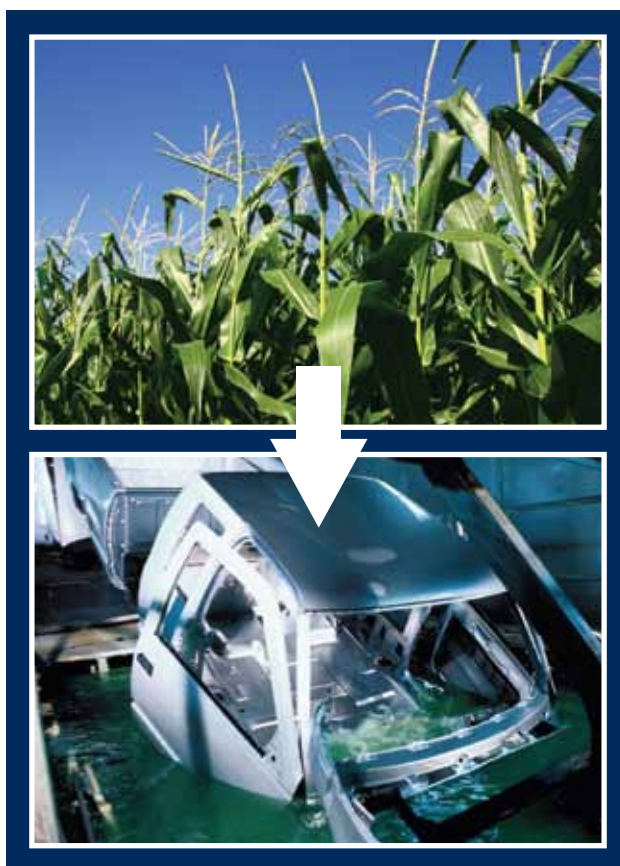
This longer-term trend, along with the shorter-termed economic recovery, should set the stage for a resurgence in fertilizer demand in coming quarters. Because of low inventories and potential supply bottlenecks, this will also impact the availability and cost of feedstocks for the surface treatment industry.

#### Current Fertilizer Market Dynamics

Like other industries, the fertilizer industry dramatically scaled back production in response to slowing demand in 2009. In Q3, Saskatchewan's PotashCorp reduced potash production by 75% compared to Q3 2008 volumes. Global shipments of potash declined in 2009, but Bill Doyle, CEO of PotashCorp, expects 2010 shipments to increase by two-thirds. Some analysts fear that producers have scaled back too far and will not be able to respond fast enough to improving market demands. Doyle is concerned as well. "Supply is likely to be challenged as demand returns," he told investors at the Citi Basic Materials Conference in New York in early December.

Many farmers, especially in emerging economies, reacted to the economic recession and record-high fertilizer prices in 2008 by minimizing applications. This had important consequences for crop yields and long-term soil fertility. The Mosaic Company reported that average yields outside the U.S. declined this year due to drought, disease and lower fertilizer use. Brazil's soybean crop declined by 7% — the largest drop in 18 years. Argentine soybean yields fell by 29%. And China's corn crop could drop by 10%. This means that farmers must ramp up fertilizer applications this year or risk even lower yields.

Inventory restocking should also spur demand. "[Phosphate and potassium] inventories from the beginning of the global distribution pipeline all the way



down to the farm field have been drawn down sharply, if not emptied, during the past year," Michael Rahm, Vice President of Mosaic, said during the company's quarterly conference call in early October. Rahm estimates that phosphate inventories dropped almost 45% in the 2008/09 agricultural year. In November, PotashCorp reported that U.S. potash inventories were 21% below the five-year average.

As the world economy improves, demand for food, and with it fertilizer, will increase. Since September, corn and soybean futures prices have climbed steadily. This is a clear sign that farmers must continue to plant and harvest record levels of crops next year. "Markets are asking farmers to keep their foot on the pedal," Rahm wrote in a recent report.

In early December, fertilizer industry executives told investors that they are seeing early signs of a recovery in fertilizer demand. "This is especially true in the phosphate market right now, but there is also activity in the potash market," Mosaic CFO Lawrence Stranghoener said.

#### Upstream Feedstock Dynamics

Phosphate rock, which is mined from the ground, is reacted with sulfuric acid to produce merchant-grade phosphoric acid (MGA). This is then used to produce diammonium phosphate (DAP), an important fertilizer, or refined into purified phosphoric acid for industrial applications, including surface treatments. The phosphate rock market is largely controlled by Morocco's Office Chérifien des Phosphate (OCP), which manages production to meet supply and maintain pricing power.

Analysts report that OCP was running operations at close to full capacity in Q3. Third-quarter American phosphate production was up 14% over Q2. Phosphate rock prices are holding steady in Q4 but stronger demand for finished phosphate products could quickly move them higher.

According to ICIS, the global DAP market strengthened considerably in November. "DAP demand in China showed no sign of abating," ICIS said. Distributor demand was "insatiable" and producers worldwide were sold out through the end of the year.

Sulfur prices rose in Q4. Demand has strengthened and supply has tightened due to reduced refinery throughput and increased processing of sweet crude. This will impact the price of sulfuric acid and downstream products like MGA and phosphoric acid.

Potash is an important fertilizer. It's also a feedstock for caustic potash, a raw material used in the formulation of metal pretreatment products. Potash prices have retreated from the peaks experienced in 2008 but are still high compared to historical trends. This has caused farmers to delay buying decisions. But they can't stall forever. China is the largest importer of potash. It does not have the domestic reserves to meet present or future potash demands. The country will have to place orders in January in order to receive deliveries in time for spring planting, PotashCorp's Doyle explained during the company's Q3 results conference call. If the Chinese economy continues to expand, as many economists forecast, then potash demand should ramp up and prices will strengthen.

"We know that the current slowdown will pass and that a strong demand surge is likely to follow," Doyle said earlier this year. "It's like watching someone pull back on the pocket of a slingshot. When this is unleashed, we expect a significant rebound that will carry us forward." ■

### DECIPHERING DEMAND

As chemical companies reported third quarter earnings in late October, many executives attributed better-than-expected results to fierce cost-cutting actions and a minor resurgence in demand. Despite some very cautious optimism, no one had a clear vision of the demand landscape in coming months. End-of-the-year maneuvering further clouded their crystal balls.

The Bureau of Economic Analysis reported an upturn in manufacturing in Q3. Chemical production grew by 5.6% and utilization rates climbed to 72.3% from 70.5% in Q2. Third quarter GDP numbers showed a broad rebound in demand. And sales of chemical products grew for the first time in a year. All in all, it looked like demand was picking up modestly and chemical companies were responding with increased production.

By the end of the year, companies were doing what they could to finish out the year with zero inventory. And companies at nodes all along the chemicals supply chain extended seasonal goodwill to shareholders in the form of longer holiday shutdowns — two weeks instead of the traditional one — as the final attempt of cost savings for 2009.



The problem is that this injected additional pressure into the supply chain in November. Suppliers were trying to gauge inventories and ensure that they dwindle to nothing by the new year. At the same time, their customers were trying to build inventory prior to extended shutdowns. The result: suppliers experienced an unexpected surge in demand that they could not handle. And they had trouble sorting out what part of this demand build was due to the nascent economic recovery and what was an artifact of the year-end inventory game.

The big question now is how much will demand pick up in early 2010? And will suppliers have the wherewithal to supply that demand? Bottlenecks could quickly form as the recovery gains traction.

Insiders fear that all this uncertainty could lead to irrational panic as the industry starts up again in January. If the panic takes the form of a buying binge, prices could quickly escalate. ■

## UPDATE: FATS & OILS

A wide range of fats and oils are used in lubricants, including those for metal removal, metal forming, rust preventatives and steel mill operations. Many of the fats and oils are traded on commodity exchanges around the world. Their prices fluctuate in response to weather, crop conditions, supply, demand and speculation. Like most commodities, prices have climbed steadily since the beginning of the year, driven largely by a gradual increase in demand. Additional factors tightened rapeseed oil, castor oil and animal fat markets this year and caused prices to rise even further.

### Rapeseed Oil

Because of its high oil content, rapeseed is especially prone to spoilage. Last spring, water infiltrated storage silos and a large quantity of seed rotted. This tightened North American supply of the seed and caused rapeseed oil prices to spike in Q3. By mid-November, rapeseed oil prices had climbed almost 30% since March. Prices appear to be holding steady in Q4.

### Castor Oil

Unlike other vegetable oils, castor oil is not traded on commodities markets. Buyers must purchase directly from the crushers, who tend to try and time the market by holding back castor beans in anticipation of higher prices. Lately, the rise in the price of castor oil has begun to accelerate, driven by fears that this year's crop will not meet demand.

India is the only global exporter of the oil. Conditions related to the Indian crop and crush drive the market. This year, India experienced the worst drought since 1972, which reduced the global availability of castor oil by 30-35%. Global demand is strengthening while castor bean plantings in India declined by 11% this fall.

By mid-November, castor oil prices had climbed over 20% since March. Analysts suggest that the rise may be signalling fears in the marketplace that the crop will not be sufficient to meet this year's demand projections. If so, prices could climb further in coming months.

### Animal Fats

Declining animal fat productivity and increasing demand from the biodiesel industry this year have lowered the stocks of animal fats, including tallow and various grades of grease. Animal fat production and price are influenced by a diverse set of cost drivers.

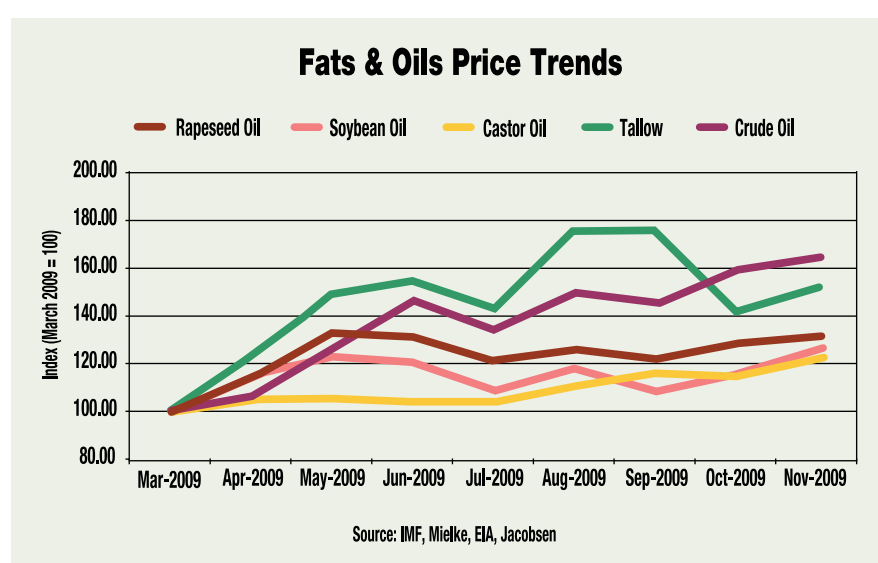
Lately, herd size has played an important role. Soaring corn prices in 2008 boosted the cost of feed for animals. By the end of 2008, many farmers did not have the economic wherewithal to feed their animals through the winter. So they culled their herds. This resulted in a sharp but short-lived increase in animal fats production in Q4 2008. All forms of animal fat are perishable — they can only be stored for so long before going rancid.

The permanent reduction in herd size is longer-lived and means that fewer animals will be available for slaughter when demand picks up.

Increasing demand from the biodiesel industry is one of the biggest threats to animal fats supply. Biodiesel producers can easily switch between feedstocks, like soybean oil and tallow. Economics usually drive the decision. When biodiesel demand is high and/or the price of soybean oil is elevated, biodiesel producers will switch to animal fats. In addition, government incentives allow biodiesel producers to out-compete other buyers for the fats. As a result, they can afford to pay higher prices, which can drive up the market.

Demand for animal fats often picks up in summer months when demand for biodiesel is seasonally high. High crude prices also increase the demand for biodiesel. All of this tightens supply and drives up animal fats prices, which in turn increases the price of fatty acids derived from tallow and used in lubricants.

Surprisingly, the recent H1N1 flu scare is also impacting supply. H1N1 is often referred to as "swine flu" because its genetic makeup is very similar to flu viruses normally found in pigs. Even though scientists assure that it is impossible to contract H1N1 flu from eating pork, North American consumers have shied



away from "the other white meat" ever since media reports about the flu picked up steam in late summer. U.S. pork prices dropped 17% in August and have remained depressed. Lower demand for pork means that fewer animals are being slaughtered, and the volume of fat reaching the market is reduced.

The combination of reduced herd size, demand from biodiesel and swine flu fears has resulted in tightened animal fats supply and rising prices. Tallow prices, which spiked in August and September and are a good barometer for other animal fats, have since retreated slightly and are now trending higher again. They were over 50% higher in November than in March 2009. ■



## UPDATE: ISOCYANATES

Escalating feedstock costs, the switch to lighter cracking slates and capacity reductions have affected raw materials used in polyurethane adhesives. The supply of some key raw materials has tightened. And prices have increased steadily during the second half of 2009.

MDI (methylene diphenyl diisocyanate) and TDI (toluene diisocyanate) are key raw materials used in the formulation of polyurethane adhesives for laminating and headlamp and taillight bonding. MDI is derived from benzene; TDI, from toluene.

The refining industry's move to lighter cracking slates continues to reduce the output of aromatics, like benzene and toluene. Flexible crackers in North America are designed to accommodate a range of feeds from heavier crude to lighter natural gas-based feeds, like propane, ethane and butane. Since January 2009, crude prices have climbed 88% while natural gas prices have dropped almost 25%. This has motivated operators to run lighter feeds to optimize

cracker economics. The cost is reduced production of important chemicals.

Benzene prices rose sharply in 2009. Despite falling from a recent peak, prices at the end of 2009 were almost three times what they were at the start of the year, and have now resumed their upward trend. Unscheduled outages are quickly impacting price and supply. "The price volatility clearly shows the industry is operating with low inventories as any incident now propels price," CMAI said in a recent report. Technon reported that MDI demand improved marginally over previous quarters and is expected to remain stable in Q4. MDI suppliers implemented price increases of 5-6% in Q4.

Toluene prices rose almost 70% in 2009 and continue to climb in December but tightening supply is having a much greater impact on TDI prices. TDI inventories are low. Planned and unplanned outages in Q3 and into Q4 tightened TDI supply around the world.

In early October, Dow Chemical declared *force majeure* on TDI production from its Freeport, Texas unit. The company lifted the *force majeure* at the end of November. ICIS reports that 20% of global TDI capacity was offline in October. Residual tightness from the outages lingers in the market. TDI prices rose 7-8% in Q4 but are expected to remain stable into Q1 2010. ■

## HIDDEN IMPACT: SPECIALTY RAW MATERIALS

Metal treatment products and coatings for the transportation industry rely on a wide range of specialty raw materials to enhance performance characteristics, serve unique niche applications and adhere to customers' proprietary specifications. While these chemicals are often crucial to the effectiveness of the products, they are also often extremely small-volume chemistries for the companies that produce them. The recession-driven drop in demand, along with a global push for rationalization and cost-cutting measures, has threatened the supply of many of these specialty raw materials.

Some specialty raw materials have become unprofitable at current demand levels. Larger suppliers, pushed by Wall Street to implement corporate cost-cutting programs, have seen incremental margins drop so far that they are choosing to discontinue the production of key chemicals. Given the low inventories throughout the supply chain, this can quickly disrupt entire downstream product lines.

Smaller, often privately-owned, companies are being forced to raise prices on specialty raw



materials in order to survive pinched margins and continue to supply customers. Given the economic stress of the past year and ongoing tightness in credit markets, many of the smaller companies are risky simply because they're small. And, unfortunately, bankruptcies are still a concern. By mid-October, Standard & Poor's reported that the number of companies filing for protection under Chapter 11 had already increased 12% over last year.

As suppliers exit a market, the reduction in competitiveness in the supply chain invariably

leads to higher prices. Many of these specialty materials are made by only one supplier. Even when there are several suppliers, there's no guarantee that one supplier's raw material will perform as well as another's in a product. Inevitably, product formulations must be tweaked, which takes time and costs money.

Often these ingredients are specialized for a reason. Formulations are built around them and substitution is not a simple process. There have always been added costs and risks associated with higher performance and specialty niche products. In today's market, the costs and risks are exacerbated. The loss of a key raw material can quickly inject extra cost into the supply chain when it's most unwelcome.

Searching for and qualifying new suppliers is not trivial especially in the current climate when so much additional due diligence evaluating suppliers' financial health is required. A seasoned procurement department with the ability to source globally along with a top flight R&D department can mitigate some of the extra cost — but not all of it — and help to minimize downtime when a supplier disappears. ■