PRESSURE-SENSITIVE ADHESIVE SUPPLY SECURITY: THREE TRENDS TO WATCH

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Buyers of pressure sensitive adhesives have experienced a multi-year period of unabated cost inflation. Despite ongoing sluggishness in the global economy, there are few signs that this inflation is easing. The rising cost of raw materials used in the formulation of pressure sensitive adhesives for the tape industry is behind much of this inflation.

Three trends, in particular, are affecting adhesives cost drivers for the tape industry. These are: the shift from heavy, crude oil-based to light, natural gas-based inputs for petrochemical crackers; fundamental and irreversible changes in the supplier landscape; and the growing power of emerging market demographics.

PSA 101

To evaluate the impact of these trends, we first must understand the raw materials used to formulate pressure sensitive adhesives for the tape industry. Common formulations in the industry are dominated by polymers and tackifiers among other additives.

Acrylate, styrene-isoprene-styrene (SIS) and styrene-butadiene-styrene (SBS) polymers will be discussed along with C5 and C9 tackifiers.

Refineries crack or break the long carbon chains of crude oil and natural gas into smaller molecules. Cracking produces primarily ethylene and a number of by-products, like propylene, butadiene, C5 and C9. Propylene is processed into crude acrylic acid, the feedstock for acrylate monomers used in adhesives, paints and other products. By-products are purified into monomers, which become the raw materials for SBS, SIS, and C5 and C9 tackifiers.

Shifting Cracking Slates

Ethylene drives the cracking business. Operators want to produce as much ethylene as they can at the lowest cost. North American crackers are flexible. This means that they can process a mix of inputs ranging from naphtha, a heavy feed derived from crude oil, to ethane, a light, natural gas-based feed. In the past, North American crackers processed mostly naphtha. That has changed in recent years with the discovery of abundant deposits of low-cost shale natural gas.

As a result, cracker operators have used every opportunity, including scheduled maintenance turnarounds and unexpected outages, to re-engineer their crackers to accept greater volumes of cheaper, lighter feeds. This improves cracker margins but at a cost, especially to the adhesives industry.

The problem is that cracking ethane produces substantially less propylene than does naphtha. This switch produces only a third of the types of molecules needed to produce SBS and less than a tenth of the feedstocks for SIS and tackifiers. [1]

The shift to lighter cracking slates is effectively reducing the volume of feedstocks available to produce pressure sensitive adhesives. Demand for these feedstocks, however, is not declining. The result is tightening supply and higher costs.

Changing Supplier Landscape

One of the sideeffects of the recent economic turmoil is the increase in supplier consolidation. Buying adhesives raw materials isn't like going to the supermarket; there are not a lot of different brands to choose from. Supplier choice was already limited before the recession. With the consolidation that we've seen in recent years, the supplier base is shrinking further. This makes it more challenging for purchasing pros to fight off price increases and diversify their supply chain to insure against disruptions.

In addition to consolidation, suppliers are consistently reevaluating their business models and product portfolios to maximize returns. From crude oil all the way down to adhesives raw materials, suppliers make strategic choices at every node along the supply chain. Because of this, many have made decisions that had a negative impact on supply to the adhesives industry.

Just because a producer is cracking the heavier feeds that produce the by-products needed by the adhesives industry doesn't mean that those by-products, like propylene, butadiene and pygas, are being recovered. They can simply be left in the stream that goes to produce gasoline. When gasoline prices are high, this option offers better value to producers.

Even if the by-products are recovered, it doesn't mean that they are processed into the monomers needed to make adhesives raw materials. For example, the supply of C5 does not necessarily go to produce tackifiers. And even if the by-products are processed into these monomers, that doesn't mean that they will flow to adhesives.

There are often other, higher-margin and higher-volume industries that compete with the adhesives industry for raw materials. Demand for butadiene and isoprene-based materials from the road markings industry, for example, is far greater than that from the adhesives industry. We must also compete against the makers of superabsorbent polymers (SAP) used in diapers for the supply of crude acrylic acid.

In addition, suppliers choose who to supply. That often means larger, higher-margin industries. This dynamic forces the adhesives industry to pay higher prices in order to incentivize suppliers to sell to adhesives producers instead of to other markets.

To compound all of this, suppliers are also changing how they price products. Supply shortages for many of the monomers used to make adhesives raw materials, in particular for piperylene and C9 monomers, have resulted in tremendous cost escalation in recent years. This price inflation has been sufficient to get suppliers' attention. Where these monomers were once considered to be by-products that had little impact on the bottom line, they are now recognized as important value streams. Suppliers are now pricing them accordingly. They are changing from formula-based pricing to market-based pricing for these monomers, effectively reestablishing the pricing baseline for many of these products at a much higher level.

The supplier landscape is changing, but not in our favor. Fewer suppliers make for a more fragile supply chain. Suppliers are choosing who to supply and are changing the way they price many products. All of these changes are increasing the costs to the adhesives industry.

Power of Emerging Markets

The middle class is growing in emerging markets. By 2020, Asia's population of the world's middle class will have grown from 28% (in 2009) to 54%. [2]

This growing population will have more disposable income, and with it comes the desire to emulate western behavior and changes to their buying habits. They are purchasing more cars, which require greater quantities of butadiene for tires and isoprene for road markings. They are also switching from cloth to disposable diapers, which compete for crude acrylic acid.

The growing demand for disposable diapers is having a profound effect on our supply chain. Crude acrylic acid is currently a supply bottleneck. Crude acrylic acid capacity utilization is at 90%, and the economy has yet to return to full strength. Any pick-up in demand will further tighten the market. Demand for superabsorbent polymers to make disposable diapers is growing and increasingly diverting the supply of crude acrylic acid away from the production of acrylates for pressure sensitive adhesives. Acrylate supply is tight even with current demand below normal levels.

In the near term, this demand pull could be exacerbated further. January 23rd marked the beginning of the Year of The Dragon in the Chinese calendar. Babies born in this year should be graced with wealth and power. Parents are trying hard to time births, planning in advance and securing the services of fertility experts to ensure the arrival of a baby in 2012. This could boost baby numbers by 5% this year. Analysts are predicting a 17% spike in diaper demand as a result. [3]

The emerging middle class is growing; they want more and can afford more. This year, we expect to see an additional demand spike, especially for SAP for diapers, due to the dragon effect. All of this is putting pressure on the supply of feedstocks and raw materials used by the adhesives industry.

Outlook

These trends are moving the supply chain for the adhesives industry permanently and irreversibly towards a new normal. Supply is already tight and costs have increased steadily in recent years. Unfortunately, we see little changing in the next several years.

Volatility will continue to be high in all raw materials markets. Supply will remain tight and we expect it to tighten further when demand starts to pick up again. We don't see any reversals in pricing trends. Suppliers have established a new baseline for many of our raw materials, one that is significantly higher than in the past.

Competition for raw materials is also intensifying. This is forcing us to pay higher prices to secure the supply of materials we need to continue to supply customers. Ultimately, costs will continue to climb.

In this new supply landscape, pressure-sensitive adhesives buyers need to develop a better understanding of the cost drivers and pressures in the upstream supply chain. One way to do this is for pressure-sensitive adhesives users to create long-term partnerships with trusted suppliers. Look for suppliers that have global reach and the scale and experience to supply customers in all economic environments.

The landscape ahead is fraught with challenges but there are some bright spots on the horizon. Suppliers have announced plans to build on-purpose propylene facilities and have announced some minor expansion in crude acrylic acid capacity. Others are pioneering bio-based pathways to create raw materials; by 2014 tire companies could be using bio-isoprene in tires.

In the meantime, adhesives suppliers and customers working closely together within a partnership framework will have the ingenuity and wherewithal needed to find creative ways to meet the current challenges and thrive in the new normal of tomorrow.

References

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