

THE URETHANE BLOG

March 5th, 2021

FLEXIBLE FOAM SHORTAGES EXPLAINED

We've had a lot of questions about why there is a shortage of foam, so here's a simple explanation. I hope it answers your questions!

Flexible Foam Production and Fabrication

Because foam is light and bulky, it is not efficient to ship very far to the various end users such as furniture manufacturers, bedding, seating and other customers. Consequently the many foam plants are located close to the end use markets and are spread around North America.

Foam is made using a number of chemicals, but the main two are polyol and toluene diisocyanate (TDI). It takes roughly two parts of polyol and one part of TDI to make foam. Foam plants buy these raw materials and have them delivered by either railcars or tank trucks. A typical foam plant will have storage tanks that are big enough to offload a few railcars (180,000 lbs each) or tank trucks (45,000 lbs each). They don't carry a large inventory of these raw materials, but depend upon a steady and timely supply of railcars and trucks in order to produce the foam for their customers.

Polyol Supply

There are a few different grades of flexible foam polyol, but the most common is made from three primary raw materials—glycerine (the initiator), ethylene oxide (EO) and most of all, propylene oxide (PO). PO is by far the main ingredient.

There are a handful of large polyol producers with a few plants in the midwest but most are on the Gulf coast—close to the propylene oxide producers.

The Propylene Oxide Bottleneck

PO is produced by three companies in North America, LyondellBasell, Dow, and Indorama. There are five physical plant locations, with four in Texas and one in Louisiana.

When the pandemic hit last March there was a lot of uncertainty about future demand. The entire furniture-foam-polyol-PO chain of production slowed to a crawl.

No one predicted that the demand for bedding and furniture would increase while people were in lock down. The industry came back in June hoping to catch up for the lost production in that April May time frame. The industry tried to run at 120% rates to make up for the two lost months, but the PO plants can only run at 100%, so there was not enough to supply everyone what they wanted. PO production issues in the Fall curtailed polyol production even further to the point that the producers had to put together allocations for their customers. No one could get everything that they needed.

Then the winter storm hit the gulf coast in mid February. When a hurricane is expected, the petrochemical industry gets prepared and often shuts down their operations in advance, weathers the storm, then gets back up and running safely and in a relatively short time frame. This storm caught everyone unprepared and many plants lost power while they were still running. It's a tribute to the industry and all the plant engineers and employees that there were no major accidents during this abrupt and unexpected shutdown. Lines in the plants froze. Power, steam, nitrogen, and hydrogen supplies were lost. All of the propylene oxide plants were shut down. It was almost like an unexpected Cat 5 hurricane hit all of Texas in the middle of the night.

Restarting those plants first requires the utilities and power. The damage can't be assessed until services like steam and nitrogen are restored (and in many cases, they're still down). Then all the lines need to be inspected and damage repaired. The plants will start at reduced rates and may take months to get back up to full rates. Meanwhile, the entire polyol inventory pipeline is empty and needs to be refilled.

There is still a lot of uncertainty about the timing for the restart of the foam industry. The situation literally changes every day as the companies assess the damage and work on repairs so the units can be restarted safely. We post daily updates here on the Urethane Blog, so check us out regularly for more information.

TDI

The TDI story is similar to propylene oxide except that there are only two domestic producers and two physical plant locations. Supply is supplemented by some imports. Those plants are located in Texas and Louisiana and were also affected by the winter storm.

Now you know why the wait time for a new chair is at least 16 weeks and may get even longer!

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