



By Brad Kalil

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COVID-19 supply & demand

As we consider how the COVID-19 pandemic is impacting the nonwovens industry, it is important to start with an understanding of the numerous nomenclature issues associated with nonwovens.

The majority of the nonwoven material in demand as a result of the pandemic is spunlaid. The primary method for categorizing nonwoven capacity and production is by the forming process. The nonwoven material forming process can be classified into four distinct categories: Drylaid, Spunlaid, Wetlaid, and Airlaid Short-Fiber. Spunlaid is a web-forming process in which the production line extrudes and supplies its own fibers from a molten polymer in one continuous process. The spunlaid processes are further defined by the web-forming processes below:

- **Spunbond:** A spunlaid technology in which the filaments have been extruded, drawn and laid on a moving screen to form a web.

- **Spunmelt:** A multiple-layer material that is generally made of various alternating layers of spunbond and meltblown webs, referred to as SMS, SMMS, SSMMS, or other beam configurations.

- **Meltblown:** A nonwoven web-forming process that extrudes and draws molten polymer resins with heated, high-velocity air to form fine filaments that are deposited onto a moving screen. In some ways the process is similar to the spunbond process, but meltblown fibers are much finer and generally measured in microns.

- **Other Spunlaid Processes:** Other processes are flashspun, coform, and a few other unique lines.

Given the demand is greater than the supply during the pandemic, nonwoven producers with other types of nonwoven web-forming processes have been able to adapt to provide some of the needed material.

The primary end-uses that are currently in high demand due to the COVID-19 outbreak, not surprisingly, are protective medical apparel, medical facemasks/surgical respirators, and disinfecting wipes. Estimates of the increase in demand run up to 20 times the normal level. In addition, the stockpiling of absorbent hygiene products has caused a surge in that end-use as well.

Supply chain

From a supply-chain perspective, the pandemic has challenged the availability of nonwoven materials

that are employed for end-uses related to the COVID-19 response.

Nonwoven material, being light in weight, tends to stay where it is produced, and as the demand for nonwovens increases, capacity investments are made in the areas where they are consumed. For example, in a 4.8 million tonne U.S. market, the net trade difference is negative 67,000 tonnes. Similarly, with goods made mostly of nonwoven material. An exception to this is “Nonwoven Medical Apparel” (HTS Code 6210.10.50), as it involves the labor of sewing. It is estimated 85% of the commodity nonwoven medical apparel used in the U.S. is produced abroad.

China's share of these imports was 80%, and Asia's share was 92% in 2019. There is not a specific HTS code for respirators and facemasks, but the Department of Health and Human Services estimate 95% of surgical masks and 70% of tighter-fitting respirators, such as N95 masks, are made abroad.



➦ Tenowo of Lincolnton, NC, quickly converted from its normal production of automotive materials to the production of AAMI Level 2 gowns and facemask materials. 📷 Tenowo, Inc.

So ... the exception to “nonwovens stay where produced” is nonwoven medical apparel and medical facemasks/respirators. And this is why we find ourselves facing the current shortage, as the pipeline of finished goods from China and Taiwan was cut off in January, essentially breaking the supply chain and triggering an immediate need for these items.

The industry's response

Many of the spunlaid nonwoven producers are multi-

nationals that began ramping up production globally in early January. The U.S. nonwovens industry has been working on ways to increase output of the needed nonwovens by changing production grades and customer mix from other end-uses (meltblown is also used in wipes, absorbent hygiene, vehicle components, sorbents, medical/surgical, and apparel), as well as utilizing any idled capacity to free up more production for facemask media and protective medical apparel. According to INDA's *North American Nonwovens Supply Report*, the spunlaid operating rate has been increasing the last three years, from 80% at the end of 2016 to 90% at the end of last year.

Spunlaid has been sold-out and at full-capacity utilization since February. All the spunlaid producers have been receiving dozens of inquiries every day for at least the last three months. If they were able to increase output, they have.

The industry has adapted by: 1. engineering material from other web-forming processes to meet the requirements of needed items; and, 2. creatively increasing capacity for needed items. For example:

- **Tenowo**, a producer of nonwoven automotive material, pivoted to medical gown and facemask materials by developing AAMI Level 2 gown and facemask materials in less than two weeks. Instead of having idled lines, the company was able to bring its employees back to work to help fight against the pandemic.

- **HDK Industries**, a supplier of nonwovens mask materials amongst others, expanded its workforce to utilize excess capacity and align its development focus to produce a new line of medical gowns that met Level 1-3 criteria. The speed of this initiative took only five weeks to develop the entire product line, a project that would normally have taken 6-8 months. HDK engaged its sister facility, Fiber Innovation Technologies, to develop a brand new fiber for use in the gown applications.

- **Lydall Performance Materials**, a manufacturer of specialty materials for filtration, sealing and advanced solutions, was receiving 10 to 12 times its normal order volume for meltblown, greatly exceeding its capacity. To address the need for facemask filtration media, it dedicated its Rochester, NH, meltblown production exclusively to this demand. This allowed Lydall to supply the filtration media for 29 million N95 masks and 34 million BFE 98/95 masks per month. The company also developed and manufactured supporting materials (comfort layers, protective layers, and tie straps) at its other locations, notably Green Island, NY.

- **ExxonMobil, INDA and others** are providing assistance to several U.S. meltblown producers—primarily sorbent producers—to change their current production to the ability produce the inner filtration layer of a facemask.

- **INDA and a key member** worked with the FDA to fast-track the approval process for disinfecting wipes to be delivered in different packaging: soft-sides as opposed to a hard canister. The approval process was completed in weeks, compared to a normal 8 to 12-month federal and state approval process, delivering billions more disinfectant wipes to retail shelves this summer.

In the longer term, we expect to see capacity additions in the U.S. to provide a greater self-sufficiency for facemask and protective medical apparel. For example, there have been some recent U.S. capacity announcements worth noting:

- **Lydall** stated “In May, we secured a major long-term agreement with Honeywell to supply meltblown filtration media for their N95 mask production facilities. Our proven technical and production capabilities were key factors in our selection. As a result, we have already committed additional capital to acquire a new meltblown production line to satisfy this and related demand.”

- **PFNonwovens** announced in a press release “that the PFN Board of Directors has approved a new nonwoven line investment in Hazleton, Pennsylvania” and “this line will also increase the capacity to produce medical fabrics in Hazleton to address medical health crises, such as COVID19”.

In addition, there have been capacity announcements in countries throughout Europe, in Asia and in South America.

Government response

The U.S. government response is still to be determined. At one end of the spectrum, things go back to the way they were, with material being supplied by offshore sources, to the other end of spectrum, with the U.S. being entirely self-sufficient. The latter will require government intervention, be it through the Domestic Production Act (DPA), the Strategic National Stockpile, and/or requirement to purchase U.S.-produced materials.

There has been one specific announcement at the end of April, when the U.S. Department of Defense executed the first military use of the DPA during the COVID-19 pandemic crisis, awarding \$133 million in contracts for N95 mask production. The contracts were issued to 3M, Honeywell, and a unit of Owens & Minor.

The road ahead

One of the biggest remaining questions impacting the supply side of the U.S. nonwovens industry is the possibility of government intervention. If that's the case, further investments in capacity will be made. Other developments that could impact the demand side:

- Does the use of sanitizing and disinfecting wipes return to its historical base usage or do behaviors by institutions, businesses and/or consumers change?

- Same holds true for facemasks ... do we return to the historical base or do consumers adjust their behavior and wear a mask when they are sick as a courtesy to protect others?

- Do consumers, businesses, health care facilities make upgrades to their Indoor Air Quality through the use of HEPA or other higher-efficiency filters? and

- Will a new “civil” facemask grade be introduced in the U.S., and will it impact usage?

My conjecture is that we end up somewhere between the two ends of the spectrum and behaviors will change in the short-term, but in the long-term settle slightly above baseline usage. 

As director of market intelligence and economic insights at INDA, Brad produces a number of market reports related to the nonwovens industry. Recent reports include: *Special Report on the Meltblown Market, 2019*; and *Worldwide Outlook for the Nonwovens Industry, 2018 – 2023*. Coming this fall, *North American Nonwovens Industry Outlook, 2019-2024*. For more information, visit inda.org.