

Filtration....a GROWTH market for Technical Textiles

By

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There are many similarities between the fiber, textile and nonwoven fabric industry and the filtration industry. The most obvious is that textile materials are used widely in the filtration as filter media. However, what is not so obvious and what few in the textile industry realize is that the filtration industry is as broadly segmented and highly fragmented as are the materials and applications in the fiber, textile and nonwoven fabric industry. Companies in both industries tend to specialize in a limited number of market segments, as it's impossible to concentrate on too many segments and understand the nuances and remain an effective supplier in the marketplace. Secondly, no supplier has the variety of materials necessary to access more than a narrow number of distinct segments.

Filtration is also like another industry in many ways: plastics. Both filtration and plastics continue to outperform the overall economy. Although there are ups and downs, both demonstrate unabated growth. Further, legislation is filtrations best friend. Not many industries can make such a claim.

With that said, this article will take you on a trip through the filtration industry and point out the most common applications using fibers, textiles, nonwoven fabrics and wire cloth filtration media. You will be pleasantly surprised how widely these materials have found their way, in whole or in part within filter configurations, and in such a variety of applications.

Starting with the transportation industry, the average automobile has 12-14 different types of filters and vents. Locations include the crankcase, gas tank, fuel line, engine air in-take, transmission, air bag inflator system and head and tail lamps and electrical motor vents. Cabin air filters have now found their way in some models, especially in Europe. The automotive industry supplies and car owners use almost 20 million original equipment and 400 million replacement oil filters annually in the United States alone. Europe uses a similar volume. There are millions of Dollars/Euro's spent worldwide on filters in the automotive factories to process machine coolant water in metal working, hydraulic fluids in equipment and presses, wastewater treatment and paint filters for the mirror finish we all want on the new car we purchase. Other filters found in transportation include trucks, buses and off the road equipment (farm and construction). Most of these filters are generally comparable in the materials used to automotive filters. Aerospace filters include fuel and hydraulic filters and passenger compartment air filters found in private, commercial and military aircraft. There are also many air and fuel filters found on small engines, such as riding and lawn mowers, chain saws, leaf blowers and many other commercial and household engines we operate from time to time. In all, transportation and small engine filtration is big business.

In our homes, we use water filters galore. They begin with the well filter and continue to filters under the sink. Gas furnace filters or oil boiler filters are in every house. Sometimes we use portable room air purifiers for allergies. Filters are used in oxygen concentrators for those people with respiratory problems. Also, room and whole house air conditioning filters. If these are not enough, there are coffee and tea filters. Outside the home, you can find photographic filters in the processing unit at the one-hour photo shop that develops our holiday season and vacation snapshots. The consumer market is both diversified and enormous with the many suppliers and specialized technologies unique to the application.

Other filters that benefit the consumer are food and beverage filters. Diatomaceous earth filter aid is blended into cellulose to filter the alcoholic beverages and fruit juices. Filters purify bottled spring and mineral water and soft drinks. Ultrafiltration membrane systems incorporating knitted channel fabrics are important in the dairy industry as are that strainers that filter the milk we put on our cereal in the morning. Woven fabrics and wire cloth sift the flour used in bread and sugar for the candy we eat. I bet you didn't realize that over four trillion cigarette filters are manufactured on a worldwide basis annually.

A list of process industry filtration and separation systems includes, cartridges, baghouse filters and vibratory shifters to name a few of the processes. Dewatering is also common method of separation and accomplished using centrifuges, filter presses and belts. There are also bulk liquid strainers baskets, backpulse systems, leaf and disk filters. Other process industry filters and separators include the removal of aerosols by pneumatic in-line filters, mist pads and candles and other devices.

Coal washing and oil deep well water and gas injection filter systems bring us fuel for energy. Filters used in nuclear power plants remove particles from coolant and wastewater. Mist eliminator cartridges purify air entering turbines and compressors. Coalescing filters extract water from every gallon of aviation jet fuel. Aviation fuel is also filtered for particulate removal and ultimately tested by passing samples through filter disks to determine whether it is adequately clean before dispensing it to the aircraft. Something we take for granted, but a critical aviation requirement.

In your office or factory, consider the many filters used in the HVAC system and in the drinking fountain. Even carbon filters with nonwoven support are used to remove ozone generated inside the copying machine. There are vent filters inside your desktop PC and the A/S 400 Mainframe in the computer room. Many filters are used in creating the computer microchip. They include HEPA Filters to purify the cleanroom air during the fabrication process. Liquid cartridge and spiral module filters are used to cleanse the water that washes the wafers with water and an endless array of aggressive solvents, with one even known as "piranha" etch. Imagine the strength of a solvent called piranha etch!

In the healthcare arena, there are membrane filters, with nonwoven support, that sterilize injectable drugs. IV bottles have submicron filtration systems (Burettes) attached including an in-line 0.2 micron IV filter, respiratory filters in the intensive care unit, vacuum canister and urine drain bag vents are common throughout the hospital. Open

heart surgery filter systems using several filtration technologies to cleanse and oxygenate the blood in the extracorporeal circuit. There are also leukocyte filters, system filters vents, syringe filters and even the surgeon's mask. It's an almost endless list.

There are many other industry segments not mentioned here, including environmental water treatment and waste management, metal plating, textile processing, desalination, analytical laboratory filters. Also, polymer filters with fiber metal felt and wire cloth used in the spinning of nylon and polyester fibers, compressed air filters, cooking oil filters and strainers, pulp and paper filters, electrophoresis, and more not even mentioned here.

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