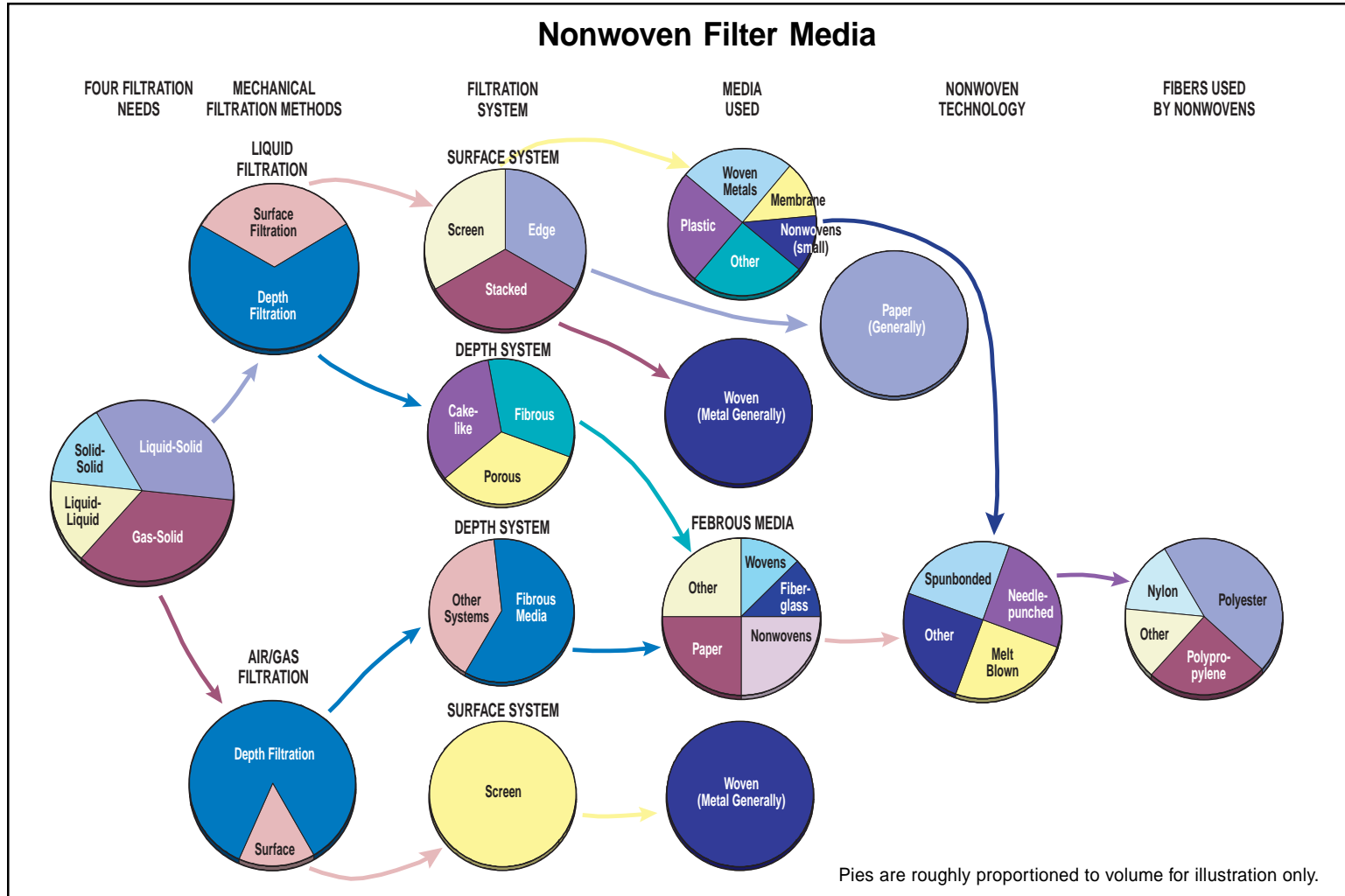


Nonwoven Filter Media



FOREWORD

Nonwoven materials used in filtration applications are an important part of the worldwide nonwoven industry. It is the fourth largest nonwovens end-use market in North America. Global annual consumption of nonwoven filter media is approaching \$2 billion. The consumption of nonwoven filter media now exceeds \$400 million in North America. Nonwoven filter materials continue to grow and capture a growing share of the filter media market because of their excellent performance and economical cost. It is a large industry, but very diverse with many types of filter producers supplying a wide variety of filtering systems and filter media to meet a wide variety of liquid, air and gaseous fluids filtration needs. The end markets are numerous and it would require pages to list them all. The average consumer is aware of filters used in their daily life, such as coffee filters, tea bags, furnace filters and disposable vacuum cleaner bags. They may be unaware of the filter systems and media used for their drinking water, air filtration at their work place or in their car, food and beverage filtration and a host of industrial processes which use filtration to separate materials, reduce pollution and improve the quality of their life.

This Handbook is INDA's first primer on the filtration industry. The book is intended to provide an overview of the total filtration industry and the growing consumption of nonwoven media in a variety of filtration applications. This primer is intended to be used as an educational and information tool.

INDA's mission is to promote the growth and profitability of the nonwovens industry worldwide. In serving its membership, INDA continually reviews and produces statistics on the nonwoven industry in North America and many world regions. In addition to a whole range of publications, INDA sponsors expositions and conferences, offers government relations, as well as technical, marketing and international trade services. This Handbook is an example of one of the many services that aid us in achieving our mission.

Ted Wirtz


President, INDA

INTRODUCTION


The worldwide market for filter equipment and systems, filter elements and filter media is an industry worth more than \$100 billion per year. The industry has been growing consistently in the 3-5% range per year. Filtration is the process of separating one substance from another and there are many types of filter systems depending upon the nature of the materials to be separated. These methods include electrostatic precipitators, centrifuges, cyclones, scrubbers and mechanical separation. Mechanical filtration, sometimes called barrier filtration, refers to a category of filter systems that use a filter media to separate fluids, either gaseous or liquid, from contaminants or other particle materials. This handbook will focus on mechanical filtering systems and their need for filter media. As shown in the Figure 1 opposite, there are many types of filter media. Some are more or less reusable. Examples of reusable media are sand and diatomaceous earth used to filter drinking water and swimming pools, or woven media and cleanable needlepunched nonwovens used in air filtration. Reusable media will be discussed in this handbook but will not be covered in detail. This handbook will focus on what we term disposable media. Several technologies dominate the disposable filter media market, which include paper, woven fabrics, loose batting or hi-loft wadding and various nonwoven materials. More specifically, this handbook will review filter media that is made of fibrous media, which include paper, fiber glass, natural and synthetic fibers.

The disposable filter media market around the world has been growing 4-5% per year. In North America, filter media is expected to maintain an annual growth rate of about 6% per year. Driving the growth of fibrous media is the need to replace filters on a regular basis as they become loaded with the contaminants they are screening. The increasing industrial activity in North America and other world regions have a direct impact on the rising consumption of filter media. Also, the rising awareness of governments, environmental agencies, industry and the general public for a cleaner, healthier environment is forcing the increased use of filtration in many industrial processes. A further driving force is the growing necessity of a clean air environment in many advanced technology industries, such as electronics, medical, pharmaceuticals, biological research, nuclear energy installations and others.

The filtration industry is extremely broad with many forms of filtering systems and filtration media. Figure 1 on the opposite page is an illustrated overview of



the mechanical filtration industry and the various media used while focussing on nonwoven media. The terminology in Figure 1 will be explained later in the handbook. Nonwovens currently have captured almost half of the disposable filtration media market. The combination of good performance and economic cost is increasing nonwovens' share of the total fiber media market.



WHERE FILTERS ARE USED

Automotive

- Fuel
- Engine lubricating oil
- Interior (cabin)
- Engine air intake
- Brakes, power steering
- Transmission fluids

Food & Beverages

- Bottled water
- Clarifying Wine, beer and distilled beverages
- Edible oils, cooking oils
- Milk
- Food flavors
- Syrups: corn, maple and other foodstuffs.
- Holding tank vents, air intakes
- Tea, coffee
- Sugar refining
- Processing grain products: soybeans, corn

Power Generation Industry

- Water intake
- Effluent water
- Steam generators
- Demineralizers
- Coolant water
- Smoke stack emissions

Transportation Industry

- Fuel, oil filters
- Interior air handling systems
- Air intakes

Home

- Swimming pool
- Furnace, air conditioning
- Exhaust fan
- Laundry
- Vacuum cleaner

Electronic Industry

- Water pre-filtration and post filtration and deionization
- Solvents
- Acid, base solutions
- Semi-conductor manufacturing
- Clean room air filtration

Water Treatment Industry

- Desalinization
- Intake water

Chemical Industry

- General process industries
- Liquid detergents
- Fabric coatings
- Paper coatings
- Paints, turpentine, varsol
- Dye stuffs
- Printing inks
- Make-up water
- Adhesives
- Electroplating solutions
- Coatings
- Floppy disc coatings
- Photographic film development

Nuclear Power Generation

- Interior air supply and exhaust
- Water intake and effluent
- Lubricating oils

Toiletries and Cosmetic Industry
Clarifying concentrates used in products, such as fruit juices
Final filtering
Oils extraction

Mining and Mineral Processing
Intake water
Effluent
Cooling water

Cement/Asphalt Production
Exhaust air dust removal

Pulp and Paper Industry
Large quantities of filtered water are used in bleaching, pulping and washing.

Pharmaceutical/Biological Industries
Ophthalmics
Oral medications
Parental fluids
Make-up water
Cultures and growth media
Serum, serum fractions
Vaccines