Blends of Fibers

THE VEGETABLE FIBERS (cotton and linen), animal fibers (wool, silk, mohair, and cashmere), furs, and pelts once provided most of the raw material for fabrics for clothing and household furnishings. Now, a variety of new fibers from the chemist's laboratory make up at least 35 percent of the total of textile fibers used in the United States.

Thus the textile industry has many fibers from which to create many fabrics—so many and so different that the consumer may not know which to buy for apparel, drapery, and other uses.

The labels and hang tags on garments contain not only general names for the manmade fibers, such as acetate, nylon, and polyester, but also the names of the companies that produce them, such as Celanese Fibers Co., Chemstrand Co., E. I. du Pont de Nemours & Co.

Further, registered trade names, such as Arnel, Avril, Dacron, Estron, Fortrel, Kodel, and Orlon, also appear on hang tags or labels, and handling instructions and claims may be printed on the hang tags.

These tags and labels are our most important guides to proper handling and claims as to performance.

A table (p. 366) gives a partial list of the major manmade fibers produced and distributed in the United States, with their generic (general) name, trade name, the producer of the fiber, the chemical class of the giant molecules that make up the fiber, and the major uses for each group.

The fibers are used alone or in combinations or blends with each other or with the vegetable and animal fibers.

Although we are primarily concerned here with fabrics made from blends or mixtures, we must remember that all-cotton fabrics are still a major source of textile fabrics. Slightly more than 4 billion pounds of cotton and about 500 million pounds of wool were used in 1965 by the American textile industry.

A TEXTILE FIBER may be a short, thin structure about an inch long, like cotton; 3 to 6 inches long, like wool; several hundred yards long, like silk; or several miles long on a single package, like a continuous filament acetate or nylon.

Very short fibers are called staple fibers. They are combed or carded and twisted by modern machinery to accomplish what our grandmothers did on their spinning wheels in order to produce a spun yarn.

All manmade fibers may be produced as staple fibers or as very long strands or bundles of fibers, which are referred to as continuous filament yarns.

Yarns spun from staple fibers usually are woven into fabrics that have subdued luster and a fuzzy surface. Continuous filament yarns are woven into smooth, lustrous fabrics.

Two or more staple fibers mixed together before they are spun into yarn form a blend of fibers. Some of the more important blends, which I discuss later, are the polyester blend with cotton and the acrylic blend with wool.

When 100 percent of a given fiber is spun into yarns, and these yarns, made up of different fibers, are arranged as stripes or checks in the fabric, it is called a combination fabric. A fabric woven with a 100-percent cotton warp and a 100-percent triacetate continuous filament filling is an example.

Knitting acetate and nylon continuous filament yarns together pro-

duces a combination tricot fabric for use in lingerie and dress goods.

Upholstery fabrics may have four or more fiber combinations of cotton, rayon, acetate, nylon, or other fibers to achieve various properties and color effects.

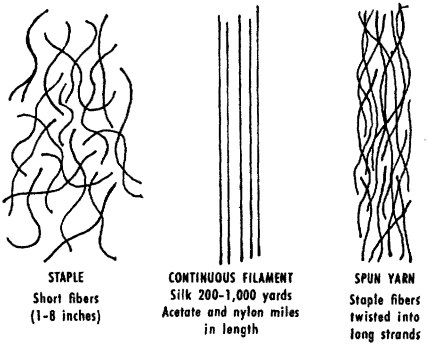
MANY FACTORS contribute to the consumer's satisfaction in using a garment, drapery, or upholstery material.

The Textile Fiber Products Identification Act was approved and made a part of the Federal Trade Commission's rules in July 1960. Its objective is to protect producers and consumers against misbranding and false advertising of the fiber content of textile fiber products. The fiber name and the generic or family name of all fibers present in amounts above 5 percent and the content of each as percentage by weight must be listed in the order of predominance.

Thus a label may read 100 percent combed cotton, 100 percent virgin wool, 100 percent Du Pont nylon, or 100 percent Celanese acetate. The label on blends or combination fabrics may read 65 percent Dacron polyester-35 percent cotton, or 50 percent Fortrel polyester-50 percent Avril rayon, or 50 percent Arnel triacetate-50 percent cotton.

This labeling program, however, gives no assurance that the garment will perform to your satisfaction in the specific end use, such as washable shirting; drycleanable printed dress; hand washable, lace-trimmed lingerie; machine washable-"no iron" slacks, and so on.

HOME ECONOMISTS, RETAIL store buyers, and consumers realize that the fiber composition of a fabric or garment is only one factor involved in producing a satisfactory product. Among the requirements are esthetic appeal, ease of handling, form stability, physiological aspects, special functional needs, retention of esthetic appeal, resistance to chemical degradation, resistance to mechanical fatigue



and wear, and ultimate strength and resistance to wear and tear.

Even when the best possible fibers are spun into proper yarns, woven and knit into well-designed fabrics, dyed to mode shades, finished to the desired feel and drape, and cut and sewn into fashionable styles, the product still can be displeasing to the consumer because the seams may pucker on washing, or the color may fade on exposure to excessive sunlight, or the cuffs, collars, or pockets may fray or wear out, or the crisp, firm feel may become soft and mushy after the first wash or drycleaning.

TEN OR SO major natural and man-made fibers account for more than 95 percent of the 7.5 billion pounds of textile fibers consumed in the United States in 1964.

Each has properties that make it suitable for one or several specific uses, but no one fiber is satisfactory for all of the dozens of garments and home-furnishings for which textiles are used.

All-cotton or all-rayon fabrics absorb moisture well, but manufacturers blend cotton and rayon with polyester fiber to achieve resistance to wrinkling and greater durability. All-cotton fabrics lose about 40 percent in strength and abrasion resistance when they are chemically treated for wash-and-wear performance.

A major development in blends has been the mixing of 65 percent polyester staple with 35 percent cotton fibers in lightweight batiste, broad-

cloth, and print fabrics for shirt and women's wear. Half-and-half blends of polyester and cotton are used in mediumweight fabrics of poplin, twill, gabardine, and sharkskin cloth for sportswear, rainwear, slacks, and sports jackets.

The cotton fiber contributes moisture absorption, comfort, a familiar touch or feel, antistatic properties, economical processing, and low fiber cost. The polyester fiber, because of its strength and resistance to abrasion, permits the construction of serviceable lighter weight fabrics.

For wash-and-wear garments, all-cotton fabrics are chemically treated to improve resistance to wrinkling. The treatment reduces the strength and abrasion resistance of the cotton fiber, but the addition of polyester fiber to the cotton increases the durability of collars and cuffs.

Because the polyester fiber absorbs little water, the polyester/cotton-blended fabrics dry faster than all-cotton fabrics of equal weight and build.

Fabrics woven or knitted of 100 percent wool fiber have become standard in men's and women's suiting, dress and casual slacks and trousers, and sweaters and other knit outerwear. Although great improvements have been made in the washability, shrinkage resistance, and the mothproofing of wool, this wonderful natural fiber still has to be handled with care in service and cleaning.

Blends of 55 percent wool and 45 percent of the polyester or acrylic fibers have improved the washability and "ease-of-care" properties. The polyester fiber, in particular, increases the resistance of the fabric to creasing.

Because the polyester fiber is so strong, blends with wool may show a tendency to pill. Firm, densely woven fabrics will pill much less than loosely woven or flannel fabrics.

Acetate and rayon fibers, the first manmade fibers, became available in the twenties. Nylon became available in the forties. Fifty percent blends of acetate and rayon are used extensively in women's suitings and dresses, men's and women's slacks, and in outerwear that can be drycleaned. The garments drape well, have an excellent feel, and are comfortable and inexpensive.

Nylon, which is highly resistant to abrasion, often is blended in 10 to 25 percent amounts with cotton or wool to improve the durability of the garments. Cotton work clothing containing 15 percent nylon staple will have two to three times the wear resistance around the pockets and cuffs.

Some fabrics are made up of arrangements of yarns, each of which is of only one fiber. These combination fabrics may use spun yarns of two different fibers or arrangements of spun and continuous filament yarns.

A variety of check and stripe fabrics is woven with six yarns of 100 percent cotton followed by six yarns of 100 percent continuous filament triacetate. When the fabrics are dyed with selected dyes for the cotton only, the resultant fabrics will have colored stripes or checks of cotton surrounded by white undyed triacetate stripes.

Because cotton shrinks and triacetate does not, puckered or seersucker fabrics can be produced. By stabilization of the two fibers by chemical and thermal treatments, washable, flat fabrics can be prepared.

Tens of millions of pounds of continuous filament acetate, triacetate, and nylon are warp knit into tricot fabrics for use in lingerie, bedwear, shirting, and dress goods. Frequently, fine yarns of nylon are warp knit together with continuous filament acetate or triacetate. The nylon contributes considerable strength and reinforces the acetate or triacetate yarn, which contributes drape, cover, and comfort to the fabric.

For stretch garments, particularly ski pants, specially textured nylon and polyester filament yarns have been used in combination with cotton or wool yarns. The textured strong yarns behave like springs, and permit a stretch of 25 to 35 percent in sports clothing. (FRED FORTESS)

Generic name	*Manufacturer's trade name*	*Manufacturer*	*Fiber type*	*Major end uses*
Acetate	Celanese	Celanese Fibers Co.	Secondary cellulose acetate, filament and staple.	Lingerie, dress goods, drapery, sports and casual wear. Fiberfil.
	Estron*	Eastman Chemical Products, Inc.		
	Avisco*	American Viscose Div. (FMC).		
	Acele*	E. I. du Pont de Nemours & Co.		
Triacetate	Arnel*	Celanese Fibers Co.	Cellulose triacetate, filament and staple.	Tricot lingerie and outerwear dress goods, sports and casual wear.
Acrylic	Orlon*	E. I. du Pont de Nemours & Co.	Polyacrylonitrile (primarily staple).	Sweaters, knit goods, men's and women's slacks, carpets, blankets.
	Acrilan*	Chemstrand Co.		
	Creslan*	American Cyanamid Co.		
Nylon 66	Du Pont*	E. I. du Pont de Nemours & Co.	Polyamide (primarily continuous filament).	Hosiery and socks, lingerie, dress goods, blouses, upholstery, carpets, knit sports goods, uniforms and work clothing, and industrial yarns.
	Chemstrand*	Chemstrand Co.		
	Celanese	Celanese Fibers Co.		
	Beaunit	Beaunit Fibers.		
Nylon 6	Caprolan*	Allied Chemical Corp.	Same as for Nylon 66.	Same as for Nylon 66.
	Enka*	American Enka Corp.		
	Beaunit	Beaunit Fibers.		
	Firestone*	Firestone Synthetic Fibers Co.		
Polyester	Dacron*	E. I. du Pont de Nemours & Co.	Polyester (primarily staple), filament for special applications.	Blends with cotton for shirting, sports clothing, dress goods, slacks. Blends with wool for suitings. Knit goods for shirting and sports wear. Fiberfil.
	Fortrel*	Fiber Industries, Inc.		
	Kodel*	Eastman Chemical Products, Inc.		
	Vycron*	Beaunit Fibers.		
Rayon	Avril*	American Viscose Div. (FMC).	Regenerated cellulose filament and staple.	Men's and women's slacks and suitings. Women's wear. Linings and drapery. Blankets, carpets, industrial yarns.
	Zantrel*	American Enka Corp.		
	Cuprammonium	Beaunit Fibers.		
	Fibro*	Courtaulds North America, Inc.		
Glass	Fiberglas*	Owens-Corning Fiberglas Corp.	Silicon dioxide (sand) plus fluxes to lower melting point.	Nonflammable drapes, curtains, bedspreads, industrial fabrics.
	Beta Fiberglas	Owens-Corning Fiberglas Corp.		
	PPG*	Pittsburgh Plate Glass Co.		
	Garon*	Johns-Manville Fiber Glass, Inc.		
	Vitron*	Johns-Manville Fiber Glass, Inc.		

*Registered trademark.

A FEW OF THE IMPORTANT BLENDS AND THEIR APPLICATIONS

End use	*Fiber blends*	*Fabric construction*	*Important properties*
Dress shirts	65/35 polyester/cotton.	Batiste. Broadcloth. Oxford.	Ease of care, fast drying, wrinkle resistant, durability.
Blouse	65/35 polyester/cotton.	Broadcloth. Crepe Combinations. Taffetas. Failles.	Ease of care, lightweight, appearance retention, fast drying, durability.
Dress goods	65/35 polyester/cotton.	Broadcloth. Challis. Checks. Crepes. Twills. Linens.	Washability, ease of care, color styling, shape retention.
Printed and plain	50/50 polyester/cotton.		
Dyed	50/50 polyester/rayon. 50/50 triacetate/cotton.		
Sportswear	65/35 polyester/cotton.	Sharkskin. Serge. Twills. Linens. Poplins. Sateens. Oxfords. Flannels.	Ease of care, durability, appearance retention, color styling, pleatability.
Shirting	50/50 polyester/cotton.		
Circular knit goods	55/45 acrylic/wool.		
Slacks	50/50 acrylic/rayon.		
Slacks	65/35 polyester/cotton.	Gabardine. Twills. Tropicals. Denims. Sharkskin.	Appearance retention, washable or drycleanable (wool), ease of care.
Casual	50/50 polyester/cotton.		
Dress	55/45 polyester/wool. 55/45 acrylic/wool. 70/30 polyester/acrylic. 50/50 triacetate/rayon. 50/50 acetate/rayon.		
Lightweight	55/45 polyester/wool. 50/50 acrylic/wool.	Gabardine. Tropical worsted. Twills. Flannels. Serge.	Durability, shape retention, ease of care.

IMPORTANT NATURAL FIBERS AND THEIR PROPERTIES AND END USES

Fiber	*Fiber characteristics*	*Important end-use properties*	*Major end uses*
Cotton	Very short lengths—7/8″ to 1.5″. Strong, low elongation. High moisture absorbing.	Excellent washability and comfort. Can be made "ease-of-care" by chemical finishing but loses strength and abrasion resistance. Slow drying.	Sheets and pillowcases, toweling, dress goods, work clothing, shirting. Blended with polyester fibers.
Wool	Short length, 1″ to 8″. Coarsest of the natural fibers. High moisture absorbency. Low strength.	High moisture absorbency. Comfort at high relative humidity. Fabric can be felted and fulled. Excellent wrinkle performance and crush resistance dry. Drycleanable. Careful washing and ironing.	Suitings, coating, blankets, carpets, sweaters and knit goods. Women's suiting, slacks, dress goods. Blended with polyester or acrylic fibers.
Silk	Long filamentous fibers 300–1,000 yards. Very fine, strong, and elastic.	Semilustrous and crisp feel. High strength makes possible sheer fabrics. Careful washing and ironing, drycleaning preferred.	Dresses, scarfs, hosiery, blouses. Combined with acetate, nylon, etc.
Linen	6–18 inches. Very coarse, strong, stiff fiber.	Silky luster, very strong and durable, poor wrinkling properties.	Tablecloths. Satin damask, dress goods, lace (blended with polyester fibers).

Soap and Syndets

YOU CAN BUY soap and synthetic detergents in liquid, powder, premeasured packet, and tablet forms, with or without pigments and with and without bleach. Some produce many suds. Some make few suds.

We can simplify the selection somewhat if we separate the products according to their general characteristics and intended purpose.

Soaps and synthetic detergents act as cleansing agents by aiding in removing soil from fabrics and by holding it in the water until the washing is finished.

Soap, the oldest and most familiar laundering product, is formed from animal fat and caustic soda (lye).

Synthetic detergents (sometimes shortened to "syndets") are made by processes in which petroleum products or animal and vegetable fats and oils are converted by chemical reactions into many complex products suited for a variety of cleaning tasks.

WE LAUNDER things to remove inert or insoluble material, such as sand, dirt particles, and oily soil (either by itself or in combination with other insoluble soil).

Soap and syndets remove the soils by wetting the fabrics and the soil; promoting emulsification (surrounding the insoluble oily substances with a film of detergent solution and thus separating it from the article); dispersing, or breaking, the soil into small particles that are more easily removed from the fibers; and holding