Materials — Man-made Fibres

Introduction

Man-made or manufactured fibres are classified as either regenerated fibres or synthetic fibres. Regenerated fibres are made by reformulating existing raw materials, normally wood pulp. Synthetic fibres are formed by causing chemical reactions between materials, usually oil-based.

Both types of fibre are formed by forcing the materials, in liquid state, through a small diameter die. These fibres are used either to form into threads, yarns and ropes, or weave into tapes or fabrics.

Manmade Fibres

Acetate

General	Properties	Uses
Made from wood pulp cellulose One of the first man-made fibres	Luxurious feel and appearance Dries quickly Shrink, moth and mildew resistant Not particularly strong	Fabrics: brocade, crepe, lace, satin

Nylon

General	Properties	Uses
Used in wide variety of applications	Very strong Flexible Abrasion resistant Easy to clean Resistant to chemical attack	Ski apparel Windbreakers Conveyor and seat belts Tents Ropes Racket strings Tarpaulins

Rayon

General	Properties	Uses
Cellulose fibre	Very absorbent Soft Easy to dye Very versatile	Clothing Rainwear Bed sheets Blankets Curtains Carpets Medical products

Acrylic

General	Properties	Uses
Used as a replacement for wool	Soft Resilient Retains shape Quick drying Resistant to moths, sunlight oil and chemicals	Fleece Fabrics Simulated furs

Polyester

General	Properties	Uses
Most widely used manmade fibre	Medium to high strength Resilient High resistance to abrasion Low water absorption	Clothing

Polyethylene

General	Properties	Uses
Used on a wide range of products	Lightweight High strength Good abrasion resistance Good wicking properties Excellent shock absorbing properties	Sportswear Rope Carpets “Bullet proof” vests External use furniture

Polypropylene

General	Properties	Uses
Versatile material	Low cost Low density Good abrasion resistance Good shock absorbing properties Good oil absorption properties (absorb ten times its own weight) Good wicking properties Very low water absorption	Thermal vests and socks Oil spill clean-up mops Artificial Turf Carpets

Elastane

General	Properties	Uses
The commercially developed fibre is called LYCRA® and is manufactured by DuPont. It is also referred to as “spandex”, primarily in the US and Canada.	Displays extreme elasticity and is capable of being stretched up to 700% of its original length. Lightweight Stronger than latex Does not irritate skin	Combined with other natural or man-made fibres, such as cotton, wool and nylon Typically the resulting combined fibre fabrics can contain between 2 and 30% elastane. Clothing Sports Clothing

Aramid

General	Properties	Uses
Commercially supplied by DuPont under the trade name of Kevlar®	Does not melt Flame resistant High strength Excellent resistance to shock loads Excellent dimensional stability at high temperatures	Hot-gas filtration Protective clothing Structural composites “Bullet-proof vests”

Melamine

General	*Properties*	*Uses*
	White and easily dyed Flame resistant Good dimensional stability at high temperatures Easily processed	Fire blocking in upholstery, heat and fire resistant clothing

Modacrylic

General	Properties	Uses
	Soft Resilient Abrasion Resistant Flame Resistant Quick drying Resists attack from acids and alkalis	Fleece fabrics Industrial fabrics Non-woven fabrics Clothing linings Simulated furs Hairpieces Carpets Curtains

Internet Resources

Fibersource is the website for the American Fibre Manufacturers Association. It provides information and links on various subjects related to synthetic and regenerated fibres.

The School of Textile and Fiber Engineering based at the Georgia Institute of Technology provides education and conducts research into textile and fibre manufacture.

The School of Textiles and Design at Leeds University is involved with education and research on all areas involved with textile manufacture and design. Research groups within the department are, Fibre Science Group, Textile/Process Engineering Group, Textile Design, and Management, Marketing, IT and Economics.

The Man Made Textile Research Association (MANTRA) based in India, conducts research into various aspects of and carries out testing of manmade materials.

The British Textile Machinery Association (BTMA) supports the activities of numerous manufacturers of textile machinery manufacturers.