POLYESTER

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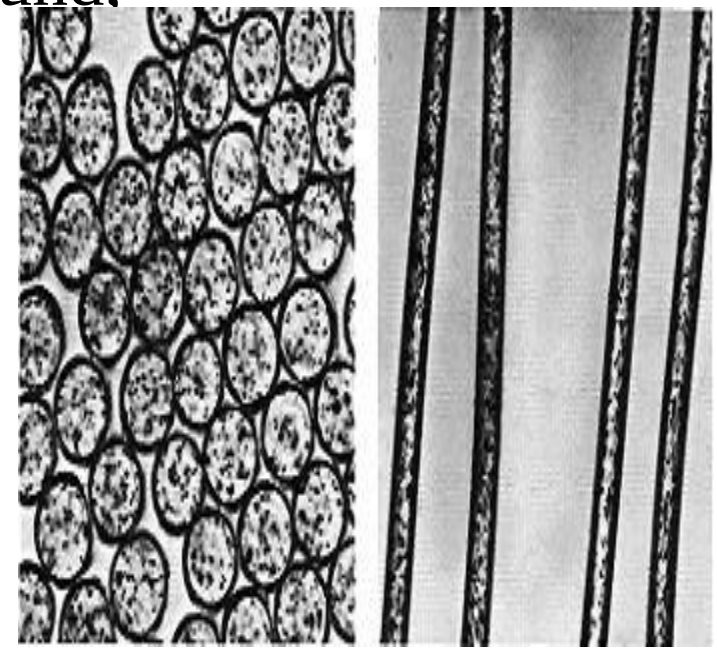
DEFINITION AND CHEMICAL COMPOSITION

- Polyester fibre is a “manufactured fibre in which the fibre forming substance is any long chain synthetic polymer composed at least 85% by weight of an ester of a dihydric alcohol (HOROH) and terephthalic acid (p–HOOC–C6H4COOH)”.
- **Polyester** is a category of polymer whose monomer contains the ester functional group.Polyester fibers are made from two kinds of terephthalate polymers:polyethylene terephthalate(PET) and 1,4 cyclohexylene-dimethylene terephthalate(PCDT). These both polymers can be homopolymer or copolymers.

- The most common polyesters are thermoplastics.
- Polyester fibers have straight molecular chains that are packed closely together and are well oriented with very strong hydrogen bonds.

MICROSCOPIC APPEARANCE OF POLYESTER

- Cross-Sectional View- circular/Round, trilobal, octolobal, oval, hollow, hexalobal and pentalobal



- Longitudinal View-Smooth rod like fibers but are not transparent like nylon and are normally white. May have speckled appearance because of delusterant .

PROPERTIES

- **Strength:** Polyester has high tenacity. It has excellent abrasion resistance. There is no change in wet strength. This is due to high crystallinity and increase in molecular weight. Tenacity : dry 3.5 - 7.0 : wet 3.5 - 7.0

- **Elasticity:** Polyester has very good elasticity. It has elongation of 20 to48%. It has very good anticreasing and pleat retention properties. The dimensional stability of polyester is high. Elastic Recovery @2% =98 : @5% = 65

- **Resiliency:** Resiliency of polyester is excellent. It resists wrinkles and when wrinkled it recovers well, whether wet or dry.

Absorbency: Absorbency is quiet low. It is 0.4 to 0.8%.Because of this it is not so comfortable next to skin. Usually used as blends with cotton fiber. It does not absorb , donot soil or stain easily and are easily washed and quickly dried. Secondly low absorbency leads to higher electrostatic properties.

Wicking: Because of wicking action ,it is comfortable to wear in hot weather, even though not absorbent.

Effect of heat: Polyester like nylon melt and drip and carry some flame down the drip, forms a tan bead. It has aromatic odour and heavy black smoke containing particles of soot. It burns with a black , waxy edge forming along the affected area. It is self extinguishing. Heat with pressure may cause glazing. Melting point : 260 - 270 ^{o}C i.e. 482 °F. Safe ironing temperature is 325°F.

Effect of light: Polyester has good light and weathering resistance, thus most important filaments for sheer curtains.

Oleophilic nature: Polyester is oleophilic in nature and tend to retain oily soil.eg. Ring around the collar.

Shrinkage: Polyester has good stability and does not shrink. Shrinkage in Boiling Water: 0 – 3Dry Heat Shrinkage: 5 - 8 (at 180 C for 20 min)

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CHEMICAL PROPERTIES

Reaction to Acids: Polyester is resistant to weak acids even at boiling point. At room temperature it is not attacked by strong acids at high concentration. It is disintegrated by strong sulfuric, hydrochloric and nitric acids.

Reaction to Alkalis: Polyester is resistant to weak alkalies. It is affected by caustic soda solution. It is degraded by strong alkalies at high temperature.

Effect of Bleaches: Polyester is resistant to bleaches especially oxidizing bleaches. It can be bleached by cotton like bleaches.

Affinity for Dyes: Polyester is difficult to dye because of compact structure and hydrophobic properties, it doesnot swell in aqueous media. Printed polyester create color crocking.

Resistance to Mildew: Polyester is resistant to the moths , fungi and microbes.