

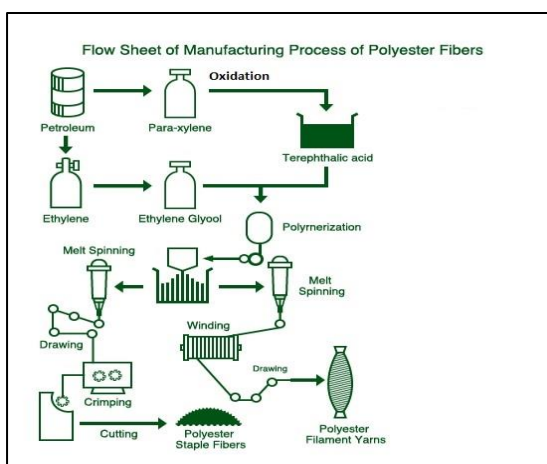
POLYESTER AND ITS BLENDS – PART V

REF: TT/ AUGUST 2020 / WK 1

Manufacturing of Polyester fiber

Polyester fiber is manufactured from petroleum, coal, air and water. Most polyester is made from petroleum from which the constituent acids and alcohols are derived.

- **Polymerization** - Condensation polymerization occurs when the acid and alcohol are reacted in a vacuum at high temperatures. The polymerized material is extruded. Once the extruded material hardens, it is cut into chips.
- **Spinning** - The chips are dried and then put into hopper reservoirs for melting. It is then heated, extruded through the spinnerets, and cooled. This type of spinning is called melt spinning. The shape of the spinneret can be changed to produce different cross-section fiber. Like hollow, circular, square, oval, and bean-shaped fibers can be formed. The different shapes affect the hand feel and strength of the fiber. Each spinneret contains 24 or more holes. A spinning finish is applied at this stage with a lubricant and an antistatic agent.
- **Crimping** - When the fiber is drawn out it is crimped. Crimping can give the fiber more texture and bulk and can increase its insulation properties, as well as its elasticity.
- **Cutting** – After melt spinning and crimping the fibers are cut into specified length to produce staple fibers.



Good to note

- Delusterants are added into the naturally bright polyester fiber during manufacturing to make them dull.

- Dyes are added during manufacturing to create bright colored fibers like electric blue and atomic red.

Fig 1.1 Manufacturing process of Polyester Staple fiber and filament yarn

Ref: jcap.gr.jp



Spin Finish

A spin finish is a preparation during spinning of polyester fibers. It is used in the form of a water-based emulsion, which contains anti-static agents, emulsifiers and lubricants.

The reasons to apply spin finishing are -

- To lubricate the fibre surface - So that they impart low fibre to fibre and fibre to machine body parts friction.
- To provide static protection to the fibre - That means to protect them from electric charges by generating low fibre-metal friction. Electric charges are generated when the spinning machines run at high speed imparting high fibre-metal friction.
- Spin Finish provides lubrication and improves the cohesion of filaments.
- To reduce fly generated due to inadequate fiber adherence.

Components of Spin Finish

- **Lubricants** - They include mineral oils, waxes and oils of esters. Mainly polymeric lubricants such as polyalkenylene oxide, polyalkenylene and silicon oils etc. are used.
- **Emulsifiers** - These emulsifiers are surfactants of anionic or nonionic substances. They include ethers and soaps of fatty acid, ethers of fatty alcohol, fatty amino ethers etc.
- **Antistatic agents** - The main Antistatic agents are Ester salts, phosphoric acid and Metal salts of fatty acid.

Challenges in Spin Finishing

- Inadequate distribution of spin finish can lead to increase in ends breakage and also accumulation of static charge.
- If spin finish penetrates into machine components when it is not running. It can cause wearing of the machine.
- Spin finish combines with dust and forms hard coating on machine parts. This increases the cleaning cost.

.....To be continued.....

| UNSCRAMBLE THE JUMBLE WORDS |
|-----------------------------|
| GINRIMPC |
| EDULRESTNATS |
| BRICANLUTS |
| MULEFISIER |

Last week's Answers: 1) RECYCLED 2) COMPONENT 3) OCEANS 4) RESISTANT

Wishing you a great week ahead!

Technical Tuesdays is a knowledge sharing initiative by Resil Chemicals Private Limited

arc@resil.com | www.resil.com