

## NYLON 6, 66

Nylon was the first commercially successful synthetic thermoplastic polymer. Dupont began its research project in 1930. The first example of nylon was produced using diamines. IG Farben developed Nylon 6, a different formulation based on caprolactum.

In 1938, New York, It is followed more famously in women's stockings or 'Nylons' which were shown at the 1939, New York World's Fair and first sold commercially in 1940. During World War II, almost all nylon production was diverted to the military for use in parachutes and parachute cords.

Nylon is a polymer a plastic with super-long, heavy molecules built up of short, endlessly repeating sections of atoms, just like a heavy metal chain is made of ever repeating links.

Nylon is not actually one, single substance but the name given to a whole family of very similar material called "Polyamides".

### MANUFACTURING PROCESS 6,6 :

Nylon 6,6 is a linear consideration polymer made from hexamethylenediamine and adipic acid. Specific amounts of the two chemicals are combined in solution to form nylon salt. This salt is purified, polymerized extruded in ribbon form, and chipped in to small flakes or pellets. These flakes or pellets are melted and extruded through a spinneret in to cool air and the nylon filaments are formed.

The polymer chips are melted by heat in an autoclave and pumped to the spinneret. The hot syrupy solution is pumped through the spinneret. It emerges in strands which can be stretched like warm fatty. The size of fibre is determined by the size of the holes and the speed with which the fibre is with drawn from spinneret. The fibre are cooled by air blown across them. By the drawing process either filament or staple fibres are prepared.

### MANUFACTURING OF NYLON 6 :

Raw material for Nylon-6 is coal, which is used to produce a chemical cyclohexane oxime, by series of complicated steps. It is then treated with sulphuric acid to form caprolactum. The molten caprolactum begins to polymerise when it is gently heated in a steam heated vessel and is constantly mixed. It is then filtered and pumped in polymerisation kettle where under controlled steamed heat and pressure, the caprolactum is stabilized to a super-polymer. The molten 6 polymer is then converted in to chips using same technique as for Nylon 6.6.

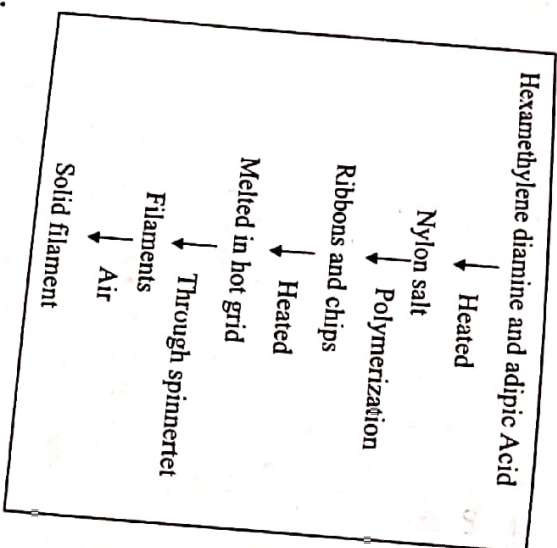


Nylon fibre is found in three forms :

- (i) Multifilament
- (ii) Mono filament
- (iii) Staple

Nylon and Nylon blends are used for various types of dress-materials, lingerie, vests, socks, laces, curtains. Nylon is used in knitting and weaving industry.

Nylon can be blend with Cotton, Nylon and Wool, Nylon and Silk, Nylon and Rayon, Nylon and Acetate.



## Nylon

### Physical Properties :

**1. Strength :** Nylon has good tenacity and the strength is not lost with age. Nylon has a high strength to weight ratio. It is the one of the lightest textile fibres is at the same time also one of the strongest. It is one of the fibre which are added at the points of wear such as knees and seats of jeans and toes and heels of socks. The strength of the nylon fabric is lost when wet. Nylon has excellent abrasion resistance.

**2. Elasticity :** Nylon has good elasticity which makes it much suitable for the apparel purposes. The excellent elasticity would mean that the nylon materials return to their original length and shreds it will not completely recover its shape.

**3. Resilience :** Nylon fabrics have excellent resilience. Nylon fabrics retain their smooth appearance and the wrinkles from the usual daily activities can be removed easily.

**4. Drapability :** Fabrics of Nylon filament yarn have excellent draping qualities. The drape of the fabrics made from nylon can be varied depending on the yarn size. The light weight sheer fabrics of nylon night gowns have high draping quality. The medium weight dress fabrics can drape very nicely.

**5. Heat-Conductivity :** The heat conductivity of the nylon fabrics vary depending upon the fabric construction, the type of nylon (staple/filament) used in the construction.

**6. Absorbency :** Nylon fabrics have low absorbency. The low absorbency of the fabrics tends to be advantageous and also disadvantageous. The main advantages of the nylons low absorbency is that the water remains on the surface of the fabrics and runs off the smooth fabric and hence dries quickly.

**7. Effect of Bleaches :** The nylon fabrics are white and generally do not need to bleach. **8. Shrinkage :** Nylon fabrics retain their shape and appearance after washing. It has good stability and does not shrink.

**9. Effect of heat :** Nylon should always be ironed at low temperatures. Using hot iron will result in glazing and then melting of the fabric.

**10. Effect of Light :** Nylon fabrics have low resistance to sun light. They are not suitable for curtains or draperies as it is weakened by the exposure to sun light.

**11. Resistance to Mildew :** Nylon fabrics have absolute resistance to the development of Mildew.

**12. Resistance to Insects :** Nylon is resistance to the moths and fungi.

**Chemical Properties :**  
**1. Reaction to Alkalies :** Nylon has excellent resistance to alkalis but the frequent and prolonged exposure to alkalis will weaken the nylon fabrics.

**2. Reaction to Acids :** Nylon is less resilient to the action of acids and is damaged by strong acids.

**3. Affinity for Dyes :** Nylon can be easily dyed with a wide range of dyes. The dyed fabric retain their colour and have good resistance to fading.

**4. Affinity to Perspiration :** Nylon fabrics are resistant to perspiration.

## IMPORTANT QUESTIONS

- Q.1. Explain the Process of Nylon 6.
- Q.2. What is the main difference between Nylon 6 and Nylon 66 ?
- Q.3. What is Polymerisation Process in Nylon ?
- Q.4. Explain the types of Nylon Fibre.
- Q.5. Explain the Process of Nylon 6,6.
- Q.6. Explain the properties of Nylon 6 and 66.
- Q.7. Explain Polymerisation Process.
- Q.8. Write the names of chemical used in Nylon 6.
- Q.9. Write the names of chemical used in Nylon 6, 66.
- Q.10. Explain multi filaments of nylon.
- Q.11. Explain mono filaments of nylon.
- Q.12. Draw the flow chart of Nylon.