**Nylon 66 Salt (NH salt)**
High molecular weight nylon 66 is only obtained if equimolecular amounts of the components are used. An excess of the components would terminate the chain by formation of an acid or amino end group. So stoichiometric portions of hexamethylene diamine and adipic acid must be used (amine to acid of 1:1). For this reason, the salt of 1 mole adipic acid and hexamethylene diamine (AH salt) is used as intermediate. The hexamethylene diamine is used as a 60-70% solution and the adipic acid as a 20% solution. The monomers are fed and mixed in the mixer and transferred to the prepolymeriser. Methanol is added and the reaction takes place. Methanol can be refluxed. The separated salt is centrifuged and washed with methanol. It is stored as a 60% solution in distilled water. It is a snow white crystal (mp - 190°C). Owing to all these constraints, batch processing is used.

**11. POLYCONDENSATION**
The concentrated salt solution is then fed to the polymerisation reactor, where the second-stage of the reaction begins (Fig 12.5 c). 60% Aq. Solution of the salt in distilled water, 0.5% acetic acid (stabilizer) is pumped into an autoclave. Increased temperature and pressure are used to initiate the polymerisation reaction. So the autoclave is heated to 275°C. The pressure is generally kept constant (1.8 MPa). Before the reaction, the autoclave is purged with very pure nitrogen (less than 0.005% oxygen) to avoid degradation and discoloration of the polymer. When the temperature of the batch reaches 275°C, the pressure is allowed to fall to atmospheric pressure. The batch is held at 270°C and atmospheric pressure for half an hour to allow removal of the water vapor. The heating is continued until all water has been distilled off. Towards the end of the distillation, the autoclave is evacuated. The polymer is obtained as a clear, low-viscous melt which is removed from the autoclave by pressure with pure nitrogen. The melt is extruded through the bottom of the reactor to form a ribbon. It is solidified and cooled in cold water cut into chips and dried. The dried chips are stored in a storage hopper in a similar manner like that of Nylon 6.

**12. SPINNING**
Nylon has sufficient stability of the melt and adequate viscosity. So it can be spun in the molten state with usual velocity (upto 2000 m/min). The polymer chips are fed to the hopper and then it is melted and homogenized in an extruder. The molten polymer after filtration is passed to the spinnerets. The melt is pumped through this system and solidifies immediately on contact with air. Cross air flow is used for solidification. The melting temperature for spinning is around 300°C. After spinning like nylon 6, the flows are stretched to get the desired elongation. The different parameters which can be varied to influence fibre properties are: (a) Mass output, (b) Winding speed, (c) Spin draw ratio, (d) Draw ratio and (e) Draw temperature. The properties which will be considered are: tensile strength, elongation, modulus, crystallinity and orientation.

**Thermal Properties**
Because of different structure, the melting point will occur in the range of 249°C to 260°C. The glass transition temperature of this fibre is in the range of 29°C- 42°C. The softening temperature i.e., the sticking temperature is 230°C. The fibre discolors, when kept at 150°C for 5 hours. The heat deflection temperature is 70°C. The decomposition of this fibre starts at 350°C.

**13.3. Chemical Properties**
[**Nylon 6, 6 fibres**](http://textilelearner.blogspot.com/2013/05/physical-properties-of-nylon-6-nylon-66.html) is more resistant to acids or alkalis in comparison with nylon 6 fibre because of light intermolecular forces present in the structure. The fibre is unaffected by most mineral acids, except hot mineral acids. The fibre dissolves with partial decomposition in concentrated solutions of hydrochloric acid, sulphuric acid and nitric acid. The fibre is soluble in formic acid. In a similar way, the fibre is attacked by strong alkalies under extreme conditions otherwise it is inert to alkalis. The fibre can be bleached by most of the bleaching agents. The fibre is mostly insoluble in all organic solvents except some phenolic compounds.

The fibre has excellent resistance to biological attacks. Prolonged exposure to sunlight causes fibre degradation and loss in strength.