Properties of polypropylene yarn production

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Abstract: This article provides information on the properties of Polypropylene yarn. A drawing on the production processes of Polypropylene yarn is also presented.

Keywords: polypropylene yarn, synthetic fibers, high-density polyethylene, temperature, propylene gas

The technological scheme used for the production of polyethylene yarn, single thread and complex thread can also be used for the production of polypropylene thread. To increase the hardness of the produced thread, it is stretched 6-7 times in a cooking-stretching machine and thermofixed with steam in an autoclave. The dried threads are rewound on conical bobbins and sent to the factories.

In the case of staple fiber production, the bundle collected from several filaments is stretched in hot water, thermofixed, corrugated, cut to a certain length and rolled.

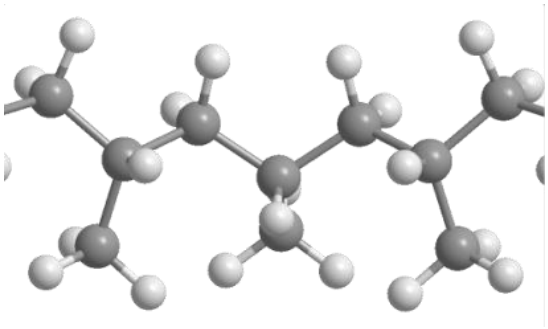
Polypropylene fiber is lighter than water (the lightest among the fibers is 910-920 kg/m^3), has high hardness (60-80 cN/tex), is resistant to chemical effects.

Polypropylene fibers (threads) are used to make ropes, fishing nets, carpets, blankets and gauze used for machinery. Special clothes, filter materials, mixed with other fibers are made from gauzes, underwear, sports clothes, tweed linings.

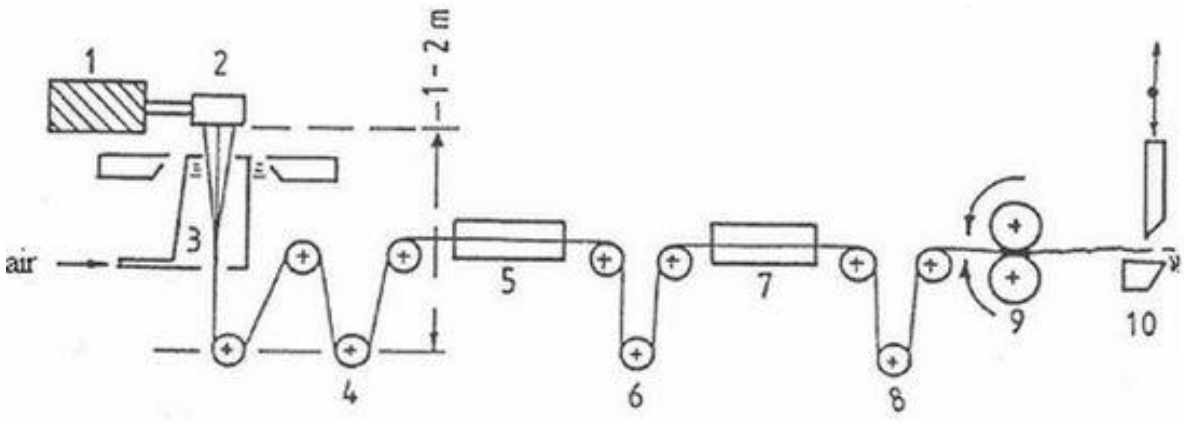
Polypropylene (PP) is the first stereoregular polymer to have achieved industrial importance. The fibres from Polypropylene were introduced to the textile arena in the 1970s and have become an important member of the rapidly growing family of synthetic fibres. Today Polypropylene enjoys fourth spot behind the “big three” fibre classes, i.e. polyester, nylon and acrylic. However, as opposed to other commodity fibres, its use as apparel and household textiles has been rather limited; the bulk of the fibre produced is used for industrial applications.

Polypropylene (PP) is a thermoplastic.

It is a linear structure based on the monomer CnH2n. It is manufactured from propylene gas in presence of a catalyst such as titanium chloride. Beside PP is a by-product of oil refining processes.



Polypropylene structure



1-Extruder, 2-Spinning pack, 3-Ouench duct, 4,6,8-Drawing, Tensioning, 5-Hot Stretching. 7-Stabilizing, 9-Crimper, 10-Cutter.

Most polypropylene used is highly crystalline and geometrically regular (i.e. isotactic) opposite to amorphous thermoplastics, such as polystyrene, PVC, polyamide, etc., which radicals are placed randomly (i.e. atactic).

It is said that PP has an intermediate level of crystallinity between low density polyethylene (LDPE) and high-density polyethylene (HDPE); On the other hand, PP has higher working temperatures and tensile strength than polyethylene.

The first polypropylene resin was produced by Giulio Natta in Spain, although commercial production began in 1957.

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