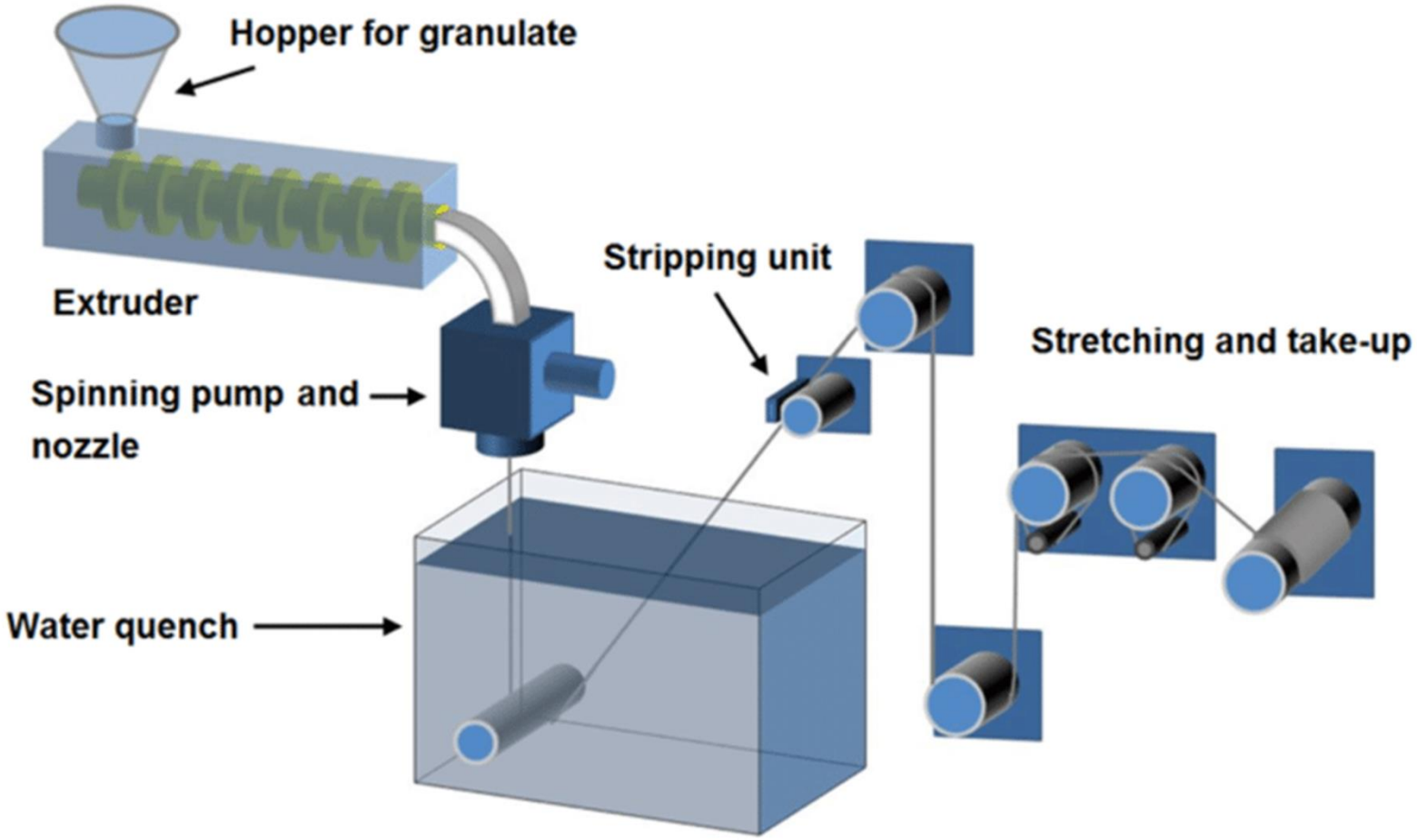
Extruding Monofilament from Polyamide,PET,PBT for fibers (brooms, bristles,fishing line, synthetic hairs…)

Author: Rajkumar Malik- CEO Malik Engineers, Mumbai, India- the makers of Extruders for all applications!

Background of Synthetic Hair or Fiber

- Synthetic hair wigs are made with finest quality plastic fibers, usually polyester, acrylic, or polyvinyl chloride. All these fibers are processed to provide a realistic look to synthetic wigs. It's not a secret that wigs that are made with synthetic fibers are less expensive than human hair wigs. However, Polyamide (nylon) has an amide group in its constituent molecules and has a chemical structure similar to that of natural hair, and is therefore more suitable as a raw material for artificial hair fibers than other polymers. Artificial hair fibers made from polyamide can exhibit higher hygroscopicity than artificial hair fibers formed from other polymers. Polyamide artificial hair is close to the supple feel of natural hair due to this high hygroscopicity, and approximates the behaviour of natural hair when wet, and physical properties such as strength and elongation and durability. This is the reason why it is preferable to have excellent properties.

Schemetic of Mfg process



Nylon/PET/PBT Synthetic Hair Wigs

MEMF-65(NYPET) Close up

65MM Extruder for Nylon/PET/PP/PBT fiber & synthetic hair

Raw materials for synthetic hair

- Mainly, synthetic wigs are made from the raw material Nylon (polyamide), PET (polyester) and also PBT which are available in translucent, natural shade and can be incorporated with appropriate colours during Extrusion. This raw material is basically used for hair extensions, weaves, wigs and doll's hair. Synthetic hair can be styled easier than human hair. Synthetic hair wigs are specially designed to eliminate the routine styling process and to enhance the look in an affordable manner. Made with quality fibers, synthetic wigs are available in a number of colors and sizes to meet the fashion requirements of ladies. Some manufacturers blend synthetic fibers and human hair to get the most natural looking hair wigs.

Manufacturing through Extrusion

- During the Extrusion process, a single screw Extruder comprising of a screw, barrel combination is used to feed, melt and pump the polymer pellets past a die (spinneret) consisting of many holes through which the polymer extrudes continuously as strands or fibers. Practice is to interpose a spinning melt pump between Extruder and Die the object being to supply the melt to die at constant pressure and flow rate for better product dimensions. Also, the fibers are usually thicker than the desired deniers (weight in gms/9000 mt of fibers as it is specified). After passing through a Chilling tank, the strands are cooled down to near room tempt. And re-heated in a heating bath or stretching oven through which they are drawn or stretched (drawn down) several times the original cross section, this imparts considerable tensile strength to the final filaments even though very less cross section. The take-up or stretching equipment is called as “godet” (pronounced “go day”) The finished filaments are collected as individual spools on multiple stations cheese winders, or as bunches or “hanks” on Hank Winder for multiple handling.

Understanding Monofilament sizing:

- Yarns are bought and sold by weight not length. Because of this sizes(or numbers) are used to express a relationship between unit length and weight of yarn. Thus as the number goes up, so does the weight and dia increase correspondingly. This number then expresses the weight of yarn per unit standard length, usually 9000 M or 9 Km.
- Denier = weight(gms)/9000 M
- Human hair, typically 20 deniers, would weigh 20x9000 gms/9Km, i.e 180000 gms or 180 Kg! Synthetic hair is much lighter with corresponding less deniers.
- The yarn number says the total Denier as also number of filaments in a Bundle. Thus number 150/48 means that the weight in gms divided by 9000M length is 150 and there are 48 filaments in a Bundle.

The MALIK'S Monofilament Extruder Range

- Plant comprises:
- Single screw Extruder- Helical Gear/Motor/Nitrided Screw Barrel set.
- Vertical die head, spinneret with or without Melt spinning pump
- Stainless Chilling tank
- 1st Godet or take up station
- Stretching Plate for fiber stretching

….Extruder range

- 2nd or stretching godet station
- Stabilising tank.
- 3rd godet or takeup station
- Collection device- Cheese or Hank Winder.
- Control console with solid state or digital electronics.
- Screw sizes avbl 65,75,90mm. Motor powers 15 thru 37 Kw output through 50-200 Kg/hour

Thank you!

- Courtesy:

Rajkumar Malik (CEO)
Malik Engineers
Unit no: 1, Shailesh Ind. Estate-1,
Navghar,
Vasai(East) – 401210, Maharashtra, India
(+91982167601 2) Email:
info@malikengg.com
www.malikengg.com