

How to solve metallocene polyethylene blowing film easy to break

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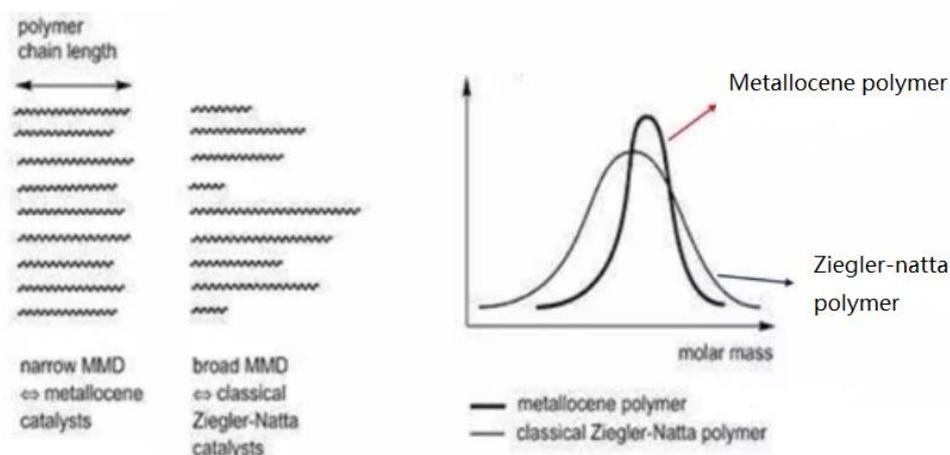
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1.Characteristics of metallocene polyethylene film

Metallocene polyethylene (mPE) is a polyethylene material produced by reaction of metallocene catalyst. Compared with LLDPE prepared by ordinary ziegler-natta catalyst, mPE has a relatively narrow molecular weight distribution and a relatively uniform composition distribution. Therefore, the prepared film has a high strength and a good uniformity of strength in both directions.

Due to the narrow molecular weight distribution, low molecular content rarely, chemical extraction resistance and pollution resistance performs good, thin film viscosity is low; It also does not contain superhigh molecular matter, so it has fewer crystal points. MPE film has excellent physical and mechanical properties, such as: puncture resistance, impact resistance, high tension, tear characteristics. The film has good heat sealing performance, low heat sealing temperature, wide range of heat sealing temperature, low melting peak, shortening heat sealing time, good sealing performance, greatly reducing leakage and fracture.

In addition, mPE film also has food packaging needs moisture-proof, air-proof, oxidation resistance, oil resistance, frost resistance, cooking resistance, chemical corrosion resistance, non-toxic, tasteless, does not affect the food nutrients, maintain food flavor, good printing performance, easy to open, and other characteristics, so it has become a high-performance packaging film commonly used resin materials. General LLDPE film is easy to produce migration and oxidation in the presence of grease. Under the action of alkali, acid or strong surfactant, thermal sealing weld will often break and cause pollution.



Comparison of metallocene with ziegler-natta polymer

And mPE film has the traditional LDPE, LLDPE, PP, EVA material film than many advantages, is gradually replacing part of the traditional packaging

materials, it will be excellent performance in the packaging industry occupies a very important position.

2.Material selection and formula design

mPE resin has certain requirements on technology and equipment in the process of blowing film, and the production cost of mPE film is restricted. In the production process, mPE/LLDPE blending extrusion blow molding method was adopted to obtain packaging materials with excellent performance, which reduced the comprehensive cost of the film, reduced the melt viscosity and torque transferred to the screw, thus reducing the driving load and realizing the mass production of the film. High-performance packaging film production ratio generally mPE was 60%, LLDPE and LDPE was 40%, the cost, production process and performance to achieve the ideal state.

3.High performance packaging mPE film production process control

Metallocene polyethylene resin because of its special molecular weight distribution and composition distribution, determine the polymer processing technology and processing equipment and traditional materials are different. In the process of metallocene thin film production, the normal operation of equipment and strict control of technological conditions must be ensured, in order to achieve stable product quality.

(1). Production process: the production process of mPE film is basically the same as that of ordinary polyethylene film, but the process conditions are different. The process flow is roughly as follows: batching - stirring - extrusion - blowing - cooling - corona - traction - winding - inspection - packaging.

(2). Blow molding process control: at present, the price of metallocene polyethylene resin is higher than that of ordinary polyethylene resin. In order to reduce the cost, mPE is mixed with general grade LLDPE or LDPE resin. When the raw material is measured into the feeding section of the extruder, the resin is in the melting stage, the viscosity increases suddenly, and the torque is transferred through the screw to drive the motor current to rise. If the control is not good, it will lead to shutdown or other phenomena, and the temperature of the materials in the machine will rise accordingly. When the melt exits the die, the traction will be unstable, and the broken film, broken film and film bubble will be unstable, which will affect the width and thickness uniformity of the film.

If the temperature drop, the film plasticization is not good, crystal point, poor transparency, the mechanical properties of the film decreased, the film is hard, and rough. There are a series of problems such as local shrinkage, delamination and poor heat sealing effect when it is compounded with other thin films. Therefore, mPE blowing process is best to follow: low - high - medium - medium temperature zone extrusion process, so as to make melt plasticizing uniform, smooth discharge, traction, winding normal.

Thus, low temperature should be kept in the feeding section to ensure timely feeding and strong thrust. In the compression section, the temperature should rise rapidly to make the resin melt in advance and reduce the over-torque reaction caused by the increase of the melt viscosity. Melt into homogenization section should adopt the method of cooling to facilitate the transfer of more heat accumulation, make the material in a stable viscous flow state, ensure melt balance through the filter, form a stable tube film, eliminate melt rupture phenomenon, lay a good foundation for traction and cooling behind.

Cooling is also an important part of mPE film processing. As mPE resin melt extrusion temperature is higher than traditional LLDPE and crystallization temperature is lower than LLDPE, timely transfer of melt heat is particularly important. The double-layer air ring should be used to dissipate heat in time to meet the technological requirements. Proper blowing ratio helps to cool the film bubble, improve the balance orientation of the film, and ensure the uniformity of film thickness. Blew up in mPE film production process, it is better than keep between 1.8 3.5 frost line height should be controlled in 2 D (D about the nose mouth mold diameter), to ensure the overall quality of thin film.

(3). Equipment requirements: after mPE resin enters the extruder, the material is extruded and melted. When the material enters the middle stage of melting, the melt viscosity increases sharply, and the friction of the material increases, resulting in the increase of screw torque and pressure transmission. In the production process, reasonable control of technological conditions can also reduce the load of the main engine in a certain range to ensure the normal production.

Extruder screw length to diameter ratio choice is also a key mPE film production equipment, selection of screw length to diameter ratio can produce high quality reasonable mPE membranes, at the same time also can ensure the realization of production capacity, so as to reduce the waste of a certain amount of revenues.

At present, the technical parameters of screw used in mPE film processing are not consistent, but the extruder screw should have enough extrusion pressure, so that the screw has enough shear effect in the compression section. After

entering the homogenization section and to reduce shear, make the melt is flabby, and quickly transfer heat, quick to stabilize the production capacity of the mold. General screw length-diameter ratio between 25:1-32:1 in order to ensure the mPE film output and product quality.

Conclusion

Metallocene polyethylene has been widely used in food packaging and industrial packaging due to its excellent properties. Suppliers are also actively upgrade of metallocene technology, developing a new generation of metallocene material, makes every effort to achieve the performance, stiffness, processing, heat sealing and so on various aspects of balance. Different metallocene catalysts have different metallocene properties. Users can choose suitable metallocene materials according to their own requirements.