The composition of hot melt adhesive formula and role of each component

Detail Introduction :

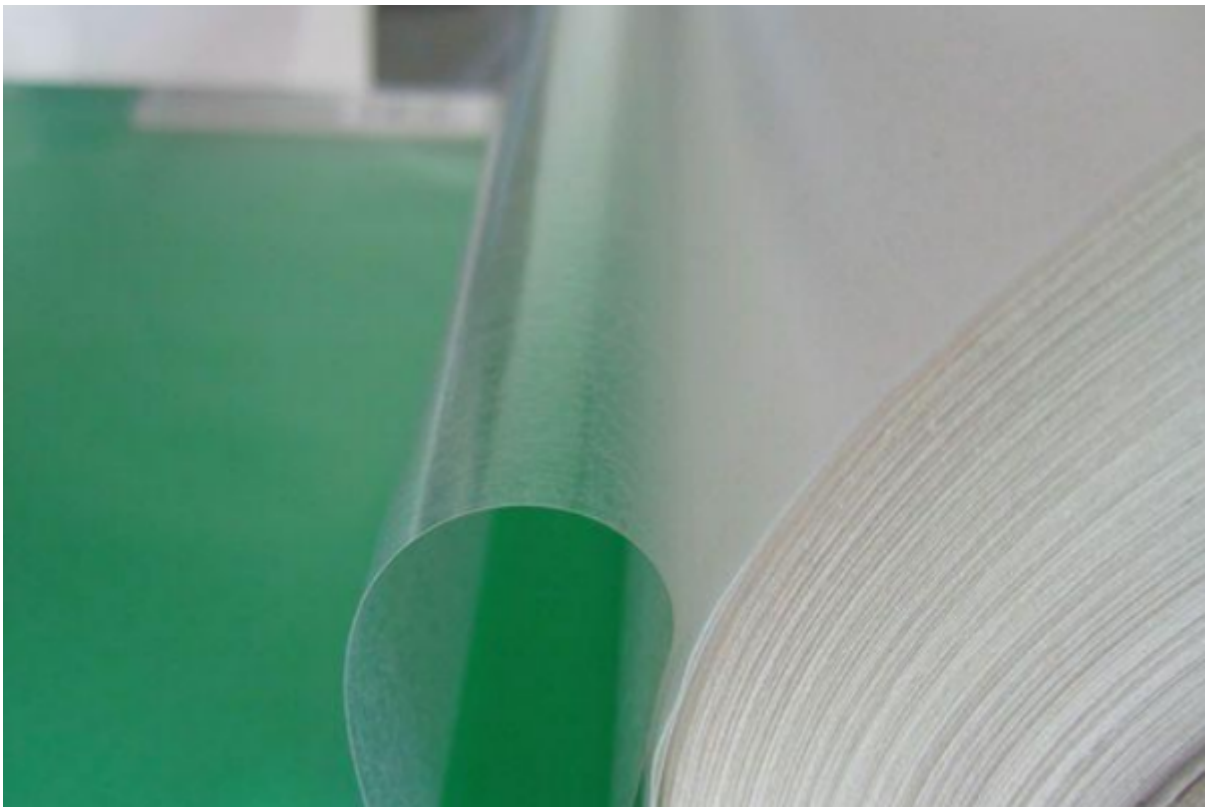
Hot melt adhesive is a very rapidly developing adhesive product with a wide range of applications. Th formula of hot melt adhesive is formulated with a mixture of basic polymers, tackifying resins (tackifi waxes and antioxidants, etc. Each component substance has its role. For example, a certain amount plasticizer, filler, and other polymers can be added as appropriate to improve the adhesion, fluidity, h resistance, cold resistance, and toughness.

Basic polymer

The basic polymer is the adhesive of the hot melt adhesive, and its role is to make the adhesive have necessary bonding strength and cohesive strength.

The basic polymers of hot melt adhesives are thermoplastic resins. More basic polymers are polyolef their copolymers, such as ethylene-vinyl acetate copolymer resin (EVA), low molecular weight polyeth (PE), ethylene - ethyl acrylate copolymer resin (EEA), random polypropylene (APP), ethylene-acrylic co (EAA); thermoplastic elastomers, such as butyl rubber (BR), styrene-butadiene block copolymer (SBS), isoprene block copolymer (SBS), styrene - isoprene block copolymer (SBS), styrene - isoprene block co (SBS), styrene - isoprene block copolymer (SBS). Styrene-isoprene block copolymer (SIS); in addition to cellulose derivatives, polyamide resins (PA), polyester resins (PES), polyurethane resins (PU).

If a single basic polymer cannot meet the performance requirements, two or more basic polymers wi properties can be mixed. Suppose you want to improve the hot melt adhesive's cold resistance, flexib impact resistance, and creep resistance. In that case, you can add a small amount of synthetic rubber isobutyl rubber or styrene-butadiene block copolymer. You can also add random polypropylene or as reduce the cost of rubber.



Viscosity enhancer

As the viscosity of the basic polymer is generally quite high, called the interface of the wettability and viscosity is not good, so it should not be used alone, often adding good compatibility with the viscosit enhancers mixed-use.

The main role of viscosity enhancers is to reduce the melt viscosity of the hot melt adhesive, improve wettability and initial viscosity of the glued surface to improve the strength of the glue, improve oper performance and reduce the cost of the purpose. In addition, it can also be used to adjust the heat-re temperature and drying time of the adhesive.

The requirements of the tackifier are: must have good compatibility with the basic polymer; good adh the glued material; good thermal stability at the melting temperature of the hot melt adhesive. The a tackifier is 20%-150% of the basic polymer.

Commonly used adhesion enhancers are as follows.

(1) rosin and its derivatives are the most used in hot melt adhesives as a tackifier. Usually can be divi three categories.

Rosin: fat rosin, wood rosin, rosin floating oil, etc... Its main component is rosin acid, containing polar groups, small molecular weight, EVA resin, and another polar basic polymer compatibility. But its soft point is not high (70-85), and because the molecule has a conjugated double bond, easy to be oxidiz thermal stability and oxidation resistance are poor.

Modified rosin: hydrogenated rosin, disproportionated rosin, polymerized rosin, etc. The softening po rosin increases after modification, and there is no conjugated double bond, so the thermal stability a oxidation resistance are better.

Rosin resin: rosin glycerides, hydrogenated rosin pentaerythritol esters, polymerized rosin glycerides The comprehensive performance is better.
(2) terpene resin and its modified resin: terpene resin is obtained by the polymerization of terpene compounds contained in turpentine. It is stable, does not change color when exposed to light and he resistant to alkali and acid, and has good electrical properties.

Modified terpene resin is obtained by the polymerization of phenol or maleic anhydride. The polymer product with phenol can be called terpene resin, which has a high softening point, good resistance to oxidation, acid, and alkali.

(3) Petroleum resin is a polymer of unsaturated hydrocarbon fractions from petroleum pyrolysis by-p It can be divided into aliphatic, aromatic, and alicyclic, according to the carbon chain structure of unsa hydrocarbons.

Commonly used C5 and C9 petroleum resin, such as m-pentadiene petroleum resin, is obtained from five separated products m-pentadiene by cationic catalytic polymerization, solid aliphatic petroleum r with pure color and odorless, good thermal stability, strong adhesive force, and other characteristics.

In addition to the above three types of tackifiers, thermoplastic phenolic resin, low molecular weight polystyrene, and Gummaron resin are also available as a tackifier.

Waxes

The main role of waxes is to reduce the melting point and melt viscosity of hot melt adhesives, impro fluidity and wettability of the glue, improve the adhesive strength, prevent hot melt adhesives from c and reduce stress costs. In addition to polyester, polyamide hot melt adhesive basic wax, most hot m

adhesives add a certain amount of wax. But the amount is too much, the shrinkage of the adhesive b
larger, but the bonding strength is reduced, so in need to achieve greater bonding strength due to co
amount of wax. Commonly used waxes are alkane paraffin wax, microcrystalline paraffin wax, synthe
The amount of wax generally does not exceed 30% of the weight of the basic polymer.

Microcrystalline paraffin wax improves the flexibility of hot melt adhesive, bonding strength, thermal
and cold resistance are due to alkane paraffin wax. Still, the ability to prevent caking is lower than alk
paraffin wax, and the price is higher. Synthetic waxes have good compatibility with basic polymers an
chemical stability, thermal stability, and electrical properties and are better than the first two types o
waxes in use.

Filler

The role of filler is to reduce the shrinkage of hot melt adhesive textile over-penetration on the surfac
porous glue joint, improve the cold resistance and heat capacity of hot melt adhesive, extend the ope
time and reduce the cost. But the amount of filler can not be too much. Otherwise, it will make the m
viscosity of the hot melt adhesive rise, the wettability, and initial viscosity becomes poor, thus reducin
strength of the glue.

Plasticizer

The role of plasticizers is to accelerate the melting speed, reduce the melt viscosity, improve the wett
the glued material, improve the flexibility and cold resistance of the hot melt adhesive. However, if th
amount of plasticizer is too much, the cohesive strength of the adhesive layer will be reduced. At the
time, the migration and volatilization of plasticizers will also reduce the strength of the glue and the h
resistance of the glue layer. Therefore, the general hot melt adhesive only adds fewer goods without
plasticizers.

Commonly used plasticizers are dibutyl benzodicarboxylate (DBP), dioctyl benzodicarboxylate (DOP),
benzyl benzodicarboxylate (BBP), etc.

Antioxidants

The role of antioxidants is to prevent the oxidation and decomposition of hot melt adhesives at high
temperatures for a long time.

Generally speaking, if the hot melt adhesive is heated at 180 -230 for more than 10h or if the compo
has poor thermal stability, it is necessary to add an antioxidant, such as the use of heat-resistant com
and not at high temperatures for a long time, but not good antioxidants.

Of course, not all hot melt adhesive products contain all these components, and some hot melt adhe
may contain only a few or one of these components. However, the basic polymer must be included b
is the main component of the hot melt adhesive.

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