Hot Melt Adhesives

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Hot melt adhesives (HMA) have become part of everyday life. With the development of high speed manufacturing and processing equipment, hot melt adhesives can be found in many diverse areas. These range from furniture and shoe manufacture to packaging applications to the production of baby diapers and cigarettes.

What is a hot melt adhesive?

A hot melt adhesive is a thermoplastic material, solid at room temperature, which is applied in its molten form and will adhere to a surface when cooled to a temperature below its melting point. They differ from other liquid adhesives in that they set simply by cooling rather than by chemical curing or the evaporation of a solvent.

Advantages of hot melt adhesives

Hot melt adhesives being 100% solid systems, reduce transportation and storage problems. The instantaneous bond strength supplied by these adhesives has allowed the development of high speed production machinery. Their higher viscosity compared to solvent based systems allows them to be used on various porous and non-porous substrates without sacrificing bond strength. In addition, because they do not set by means of solvent evaporation, they do not create a pollution problem. This latter fact is becoming increasingly important with the rising environmental awareness being experienced world-wide.

The role of wax in hot melt adhesives

- The low viscosity of the wax is used to reduce the high viscosity of the polymer and resin to ensure efficient mixing. This reduction in viscosity is particularly important during the application stage. A low viscosity is required to pump the molten adhesive from the storage tank to the application area and to ensure proper surface wetting when applied.
- The degree of crystallinity and the congealing point of the wax in the adhesive formulation control the open and set times of the HMA, as well as the flexibility and elongation properties.
- Wax plays a major role in increasing the blocking point of the final adhesive, preventing the adhesive pastilles from sticking together during transport and storage.
- The high temperature properties of a hot melt adhesive are largely controlled by the melt range of the wax being used.

A typical HMA contains 10-30 % wax.

The most important waxes for the hot melt adhesive formulator are those derived from:synthesis

- Fischer-Tropsch waxes

crude oil refining

- paraffin waxes
- microcrystalline waxes
