Hot-melts score sizzling success

Hot-melt adhesives and coatings are a big business—estimated at 100 million lbs. for '69, a 10% increase from '68. And with hot-melts selling for 45-70¢/lb., this represents a market pegged at about $50 million this year.

New plants and new products reflect the widespread interest in hot-melts.

- Borden Chemical (New York) this month brought onstream a new hot-melt adhesives plant at Middlesex, N.J. The plant will initially produce 3 million lbs./year, will supplement the company's production at Peabody, Mass., and Compton, Calif.
- Goodyear (Akron, O.) has a new plant under construction at Belmont, Tex., to produce additives destined for hot-melts.
- And Eastman Chemical (Kingsport, Tenn.) has developed three new hot-melt adhesives for commercial use since the first of the year, is in experimental stages with 14 others.

Picked for Packaging: Adhesives, which mainly sell for more than 50¢/lb., make up 50% of the market for hot-melt resin materials. And about 75% of the hot-melt adhesives go into industrial packaging.

AtlanticRichfield Co.'s Arco Chemical Co. division, a major producer of hot-melts, says its largest market is adhesives for sealing folding cartons (such as those used for frozen foods) and corrugated paperboard cartons.

Mobil Chemical Co., probably the leader in this field, also markets primarily to paper and corrugated paperboard converters—companies that convert large rolls of paper into cartons and boxes.

Others producing these adhesives include Continental Oil Co., Shell Chemical Co., USM Corp. (Middleton, Mass.) and H. B. Fuller (St. Paul, Minn.)

For Shoes, Fabrics, Books: Other markets opening up to hot-melt adhesives: shoe manufacturing (sealing the seams, gluing uppers to soles); aluminum foil lamination; fabric bonding (*CW, Apr. 6, '68, p. 57*); bookbinding; and woodworking.

USM, for instance, has been in the hot-melt business more than 10 years, has "put soles on 300 million shoes so far," according to company spokesmen. USM also has a hot-melt, open-net web for laminating vinyl sheets in auto upholstery.

Fuller aims a large share of its production toward bookbinding, particularly magazines and catalogs. Company spokesmen say hot-melts provide a binding with "memory"—a book can be opened flat, and when it is closed again, the binding will recover its original form.

Why Hot-Melts? The basic appeal of the hot-melt systems is the almost instantaneous setting time. Because bonding is so quick (often 1-5 seconds), no drying apparatus is needed and equipment for keeping the bond under pressure until the adhesive sets can be smaller. Result: less floor space is required for the bonding unit. Packages are ready to be shipped immediately—space need not be taken up for storage.

USM says use of hot-melts can double or triple production-line rates, and fewer people are needed to produce a given number of bonds.

And because hot-melts are 100% solids, they can be kept in such forms as pellets, chips or flakes, ropes, or slabs, then melted when needed. All the product is usable, as opposed to wet glues, which sometimes contain only 25% glue in solution. There is no leakage or dripping from glue pots or application machinery.

Working with Waxes: Basically the same hot-melt ingredients that go into adhesives are also used for coatings, and many companies—particularly oil firms—make both types of products.

Most producers feel that hot-melt materials will not replace waxes in coating; they say that the hot-melt resins and waxes work best in tandem. Waxes are used as the base for hot-melt coatings, so the resins can be regarded as additives for improving properties of coating formulations.

These coatings, which generally sell at 18-46¢/lb., make up almost 30% of the total U.S. hot-melt market. (The remaining 20% of this market is in combination coating-adhesive formulations. When such a product is coated onto a carton or other container, it can later be made to act as an adhesive for sealing the package, simply by remelting.)

When applied to a paper or plastic container that has been printed or otherwise labeled, a hot-melt coating gives a smooth, glossy and transparent surface. Esthetically pleasing packaging, of course, is of cardinal importance in the marketing of virtually all consumer items, especially in self-service stores.

For Boiling and Freezing: Also, hot-melts provide enough of a moisture barrier that they can be used for water-resistant coatings. For instance, hot-melts now coat many frozen-food packets that are immersed in boiling water to cook the food inside.

A new development in farm produce packing features a box-within-a-box: a fruit or vegetable is packed in the outer area, ice in the center. This is said to keep the produce fresh and cool without danger of water-logging.

Even the construction industry is working with hot-melt products. West Coast builders, for instance, use hot-melt-coated sheeting to keep moisture from migrating through walls.

And flexibility—attainable with hot-melt additives—can mean better coatings for food packaging. Gone are the days, for example, when flakes of brittle wax floated in cartoned milk.

What They Are: Hot-melts, essentially, are combinations of petroleum waxes, hydrocarbon or terpene resins, and certain copolymers. Formulation combinations vary to achieve different hot-melt characteristics.

Resins are added for their tackifying (stickiness) properties. Both hydrocarbon resins and pinene resins are used. The pinenes, which currently sell at 32-33¢/lb., have the larger share of this additive market, but are being challenged by hydrocarbon resins, which cost only about 16-17¢/lb. (*CW, Aug. 24, '68, p. 53*). Resin mo-

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ducers include Hercules (Wilmington Del.), Neville Chemical Co. (Pittsburgh), Goodyear (Akron, O.) Reichhold Chemicals (White Plains N.Y.), and Schenectady Chemical.

Hot-melt producers say they see a potential scarcity of both types o resins, feel a price hike will have t come soon.

The copolymers — usually ethylen vinyl acetate (EVA)—add plasticity to the wax base. They also increas the moisture, oil and gas resistanc of waxes, which enhances coating ca pabilities, and help shorten settin time.

Average market price of EVA: 29 46¢/lb. in quantity, according to D Pont, one of the major EVA pro ducers. Others are USI Chemical (New York), Union Carbide, Dow Allied Chemical. Goodyear produce a similar set of polyesters for plas ticizers.

Comparing the Costs: The majo disadvantage of hot-melt systems i the cost. Hot-melt producers contend however, that on a solids-content basis hot-melts are roughly equal in cost t wet-glue systems, which may be large ly solvents. Savings in plant floor an storage space help offset the highe material costs.

And initial investment in equip ment can be sizable. But hot-melt ap plicators — rollers or extruders — ar sometimes less expensive than all th equipment needed for wet-adhesiv systems (extruders, drying tunnels and clamping equipment or extensiv "compression centers').

Other drawbacks of the hot-melt relate to their chemical reactivity. Im proper heating, for instance, may re sult in oxidation of the adhesive, wit subsequent failure. New anti-oxidan additives, such as those being deve oped by Goodyear, may help offse this.

Pulp manufacturers are also face with the problem of handling hot-me adhesive materials on books they wan to reclaim. Usually animal glues ar decomposed by the alkali used in re pulping paper waste, but hot-melt ad hesives are not.

The adhesive line must be cut off b fore the old paper can be reclaime According to Borden spokesmen, "Th industry is looking for a pulpab resin, but it hasn't been invented yet EN

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