

# Adhesive offers high tack and fast cure for panel makers

Ian Cornelius, sales manager of Apollo Adhesives, describes the development of a new two-part, solvent-free adhesive that is said to provide exceptional initial tack combined with ultra-fast cure, thus enabling companies to produce finished panels on a continuous basis in less than six minutes. He also reports on the use of the product on the panel-making line at Kingspan Insulation where it has brought a wide range of benefits.

**M**OISTURE-CURING polyurethane laminating adhesives were introduced into the United Kingdom in the late 1970s and early 1980s. These adhesives react with atmospheric moisture to produce tough, elastomeric structural bonds which exhibit excellent heat resistance. A further benefit is that the adhesive needs only to be applied to one surface of the substrate. However, it was found that these adhesives have two major drawbacks: most products contain organic solvent; panels on which the adhesive is used have to be held under pressure while it cures.

In the early 1990s the use of solvent-free, sprayable, moisture-curing polyurethane adhesives was pioneered. These helped to counter the environ-

Apollo Adhesives has announced what sales manager Ian Cornelius calls "a revolutionary breakthrough in the development of laminating adhesives". The company "pioneered the use of moisture-curing adhesives in the late 1970s and early 1980s and solvent-free sprayable moisture-curing polyurethane adhesives in the early 1990s". Now, it has introduced Astrolok Fast-Tack which it describes as being able to overcome the problems of previous developments as well as meeting the requirements of most customers who want an adhesive system that is fast, reliable, and cost-effective.

mental concerns of the original products but they did not address the logjam of having to 'press' panels for a considerable time during the curing process. Nor were related problems addressed such as the amount of space which the presses occupy, the cost of purchase, and running costs.

The adhesive required by the panel manufacturing industry was one that offered immediate tack and fast cure allowing the panels to be made on a continuous process basis through nip rollers rather than with the use of heated presses. Panel-making companies had the choice between solvent-based, single-part adhesives with all of their inherent environmental problems, or conventional two-part adhesives which require heaters

"Unlike many companies which tweak existing technology and then claim to be innovative or to have pioneered new adhesive systems, Apollo has been developing polyurethane technology for over twenty years", says Mr Cornelius. Astrolok Fast-Tack offers very fast tack development, instant bond, low coat weights, 'one-way' stick, structural bonds, freedom from solvent, good temperature resistance (-40°C to +140°C), and excellent spray characteristics. In addition, the new adhesive can be tailored to suit most bonding applications to meet the specification parameters required by customers."

to accelerate the curing process.

Development work has been carried out for about six years in an effort to overcome these problems. The result has been the introduction of a two-part, solvent-free adhesive that is stated to provide exceptional tack combined with an ultra-fast cure, thus enabling manufacturers to produce finished products on a continuous basis in less than six minutes, even at room temperature.

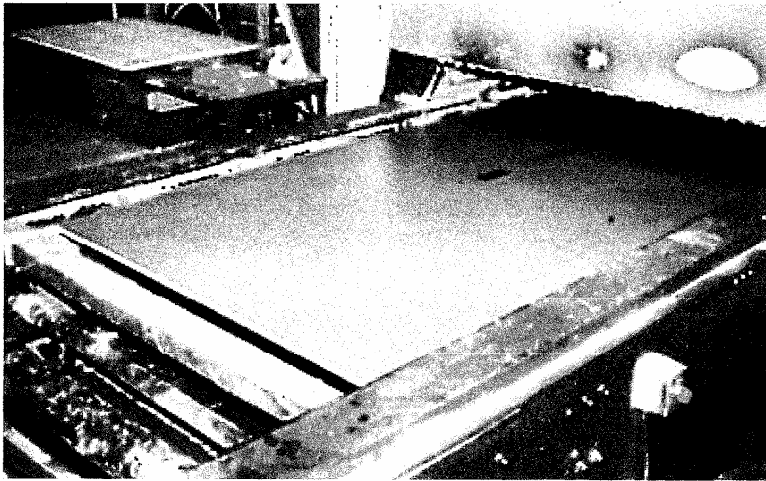
At its facility in Pembridge, Herefordshire, the new adhesive is being used by Kingspan Insulation during the manufacture of a wide range of insulation products. Many of the company's products consist of a variety of panels made up of diverse insulation materials including urethane, phenolic, and polystyrene foam, bonded to a variety of board materials such as chipboard, plasterboard, and plywood.

"We have been using a single-part, moisture-curing spray adhesive which exhibits high initial tack and fast cure", explains Kingspan's operations manager, Spencer Murtagh. "This allowed our products to be made on a continuous basis using nip rollers to consolidate the bond as panels travelled along a conveyor to be packed and despatched. The main problem with this type of adhesive is that it contains 50% organic solvent and, therefore, it had a serious impact on the local environment - many tonnes of solvent being extracted into the atmosphere every year.

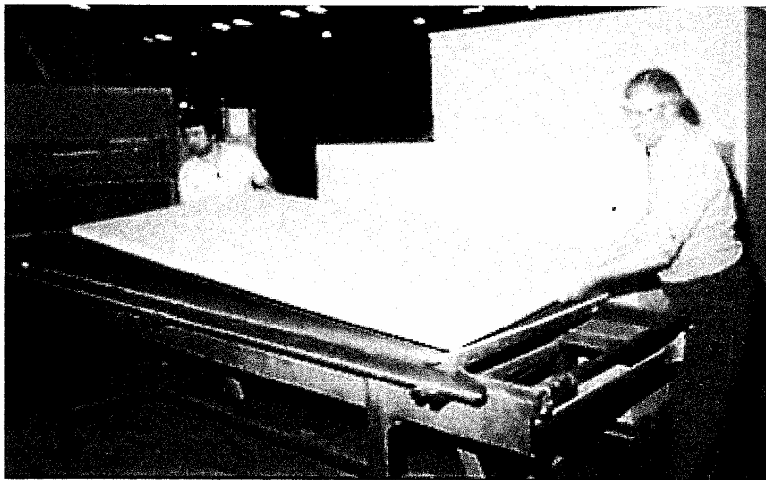
"We decided to move away from solvents but had great difficulty in finding a solvent-free product which performed as well as the existing adhesive. We evaluated a number of options, including water-based and various solvent-free adhesives."

Mr Murtagh reports that due to the importance and the urgent need to move away from solvents Kingspan was forced to switch to a conventional two-part, solvent-free spray adhesive. "Potentially, this offered us the same results as we were accustomed to with the original adhesive but we soon found that it had a number of disadvantages which resulted in a number of problems.

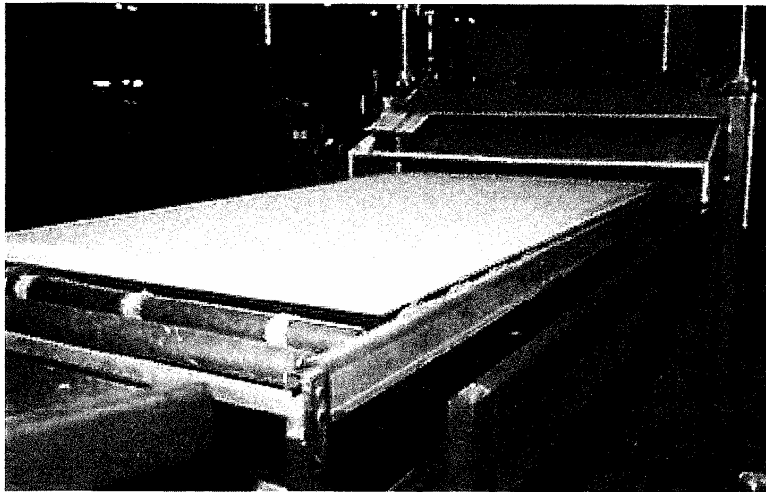
"Firstly, the company's spray booth had to be operated at over 35°C so that the adhesive was tacky enough to hold the panels together after they had been through the nip rollers. Obviously, this



30 seconds Panel sprayed with Astrolok Fast-Tack.



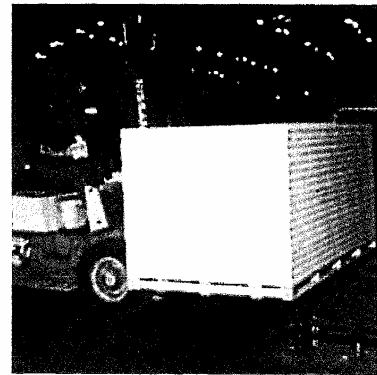
1 minute Panel brought together.



1 minute 30 seconds Panel put through nip roller.

was inconvenient to operators who had to put up with the extreme heat in the summer, and it also resulted in extra cost in order to maintain the heat level, especially in the winter months.

“Secondly, even after heating the adhesives did not have enough tack to hold some of the panels together - having been through the nip rollers panels often would spring apart thus resulting in a great deal of re-work. In some cases, this problem meant that we had to revert to a solvent-based adhesive in order to make panels which were acceptable.



8 minutes Full stack of finished panels removed for packing.

“Thirdly, we found that we needed to use far more adhesive than expected due to the fact that a fine mist was created during the spray operation leading to adhesive being lost in our extraction system. In turn, this led to a sharp rise in the company’s bond-line costs.”

Kingspan agreed to embark upon an in-depth and extensive testing programme for the new adhesive. Suitability, speed, economy, and overall effectiveness were investigated with the result that the product “passed with flying colours - it has phenomenal tack and it bonds everything we throw at it”, says Spencer Murtagh. “Once a bonded panel has passed through the pinch rollers we know that it has been stuck without us having to worry about what the bonds may look like later. The fact that this is achieved at room temperature is a very welcome bonus. We also have found that the new product runs at an actual coat-weight similar to that which we had been experiencing with the original solvent-based adhesive which we used. This factor helps us to reduce our overall adhesive costs.”

**APOLLO ADHESIVES ENQUIRY 324**