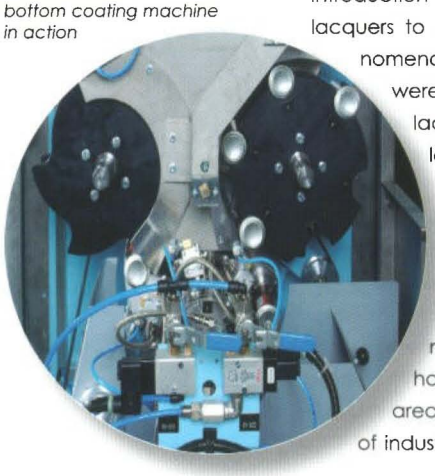
Protecting *metal*

The modules of Sprimag's HIL-15 coating machine can handle 900 cans per minute each

CanTech International can expert Evert van de Weg talks to Matthias Allar from Sprimag, a leading manufacturer of coating machines for the metal packaging industry

The need to protect iron against corrosion has been obvious since metals were first used for packaging. For centuries this was done by dipping steel sheets into a bath of tin. In the 20th century electrolysis became the technology to apply a thinner and more constant layer of tin to the steel coils that were cut into sheets. During the course of the 19th century the application of lacquers in addition to the tin layer started. These were lacquers still made from natural materials like linseed oil. With the introduction of plastics, the development of synthetic lacquers to meet a wide range of demands was phenomenal. Amongst the types of lacquers developed were epoxy-phenolic lacquers, polyester-phenolic lacquers, zinc-oxide pigmented oleoresinous lacquers etc.

The HIL-15 external can bottom coating machine in action



A company that took an active part in the development of the machines to apply coatings to metal packages was Sprimag in Kirchheim, close to Stuttgart in Germany.

Matthias Allar, senior sales and project manager of Sprimag, said: "Our company has more than 80 years of experience in this area, ranging from the design and manufacture of industrial spray guns to the development of entire automated paint finishing systems. We have been working for decades on the application of virtually any type of paint and coating produced by the leaders in each market. We have also developed close relationships with many of the world's best equipment manufacturers. The paint systems are designed and manufactured in our main office in Kirchheim, where we have a large application centre. We have fully staffed satellite offices in the US and Brazil as well as support offices in Mexico and France."

The can market

At first, Sprimag was not active in the mass markets for cans.

"In the past we supplied machines for the application of repair coatings for three-piece beverage cans," adds Allar. "We really focused on protective inner coatings for aluminium tubes and aluminium two-piece monobloc aerosol cans. Later on we started to supply coating machines for the protection of the weld seams of three-piece food cans and for the protection of the score lines of easy open ends. When the two-piece beverage can market really started to boom in Europe in the 1970s-80s, we did not take an active part in that market growth at first. At that time we were simply too busy with the huge growth of the tube

and aerosol market. However, the market for aluminium tubes took a severe blow when composite tubes started to replace them."

An unexpected event in the early 1990s led to the participation of Sprimag in the two-piece beverage can market. Maschinenfabrik Braunschweig, the former machine construction plant of the multi-national can maker Schmalbach in Braunschweig, went bust and Schmalbach (later on Ball Packaging Europe) invited Sprimag to take over the part that constructed the coating machines for the inside of cans. "We were certainly interested in such a takeover and completed the deal in 1994-1995," explains Allar.

"From that moment Sprimag was fully involved in the booming market for two-piece beverage cans. In the beginning we supplied mainly coating machines to Schmalbach/Ball Packaging Europe, but we gradually started to supply our coating machines for the inside of cans to other companies that were associated with Ball. But today Ball is still our biggest customer."

Developments

The consolidation of two-piece beverage can producers over the years has not necessarily created more opportunities for entrants into this market segment.

"Since our entrance into this industry we have supplied around 250 can internal coating machines to producers of two-piece beverage cans," remarked Allar. "However, the ongoing consolidation of the industry has not made things easy for us. Competition in this market segment is fierce. Focal points for us are higher speeds, efficiency and user-friendliness. The principle of the machines remains the same: cans are picked up and kept in position with vacuum on six stations and then up to three airless spray guns are able to coat every can maximally three times wet-on-wet. The spray guns spray the liquid coating, which is pumped under significant hydraulic pressure through a tiny orifice so that the liquid coating is atomised. After the spray booth, there is an integrated drier station. Here the coating is cured on a conveyer chain that traverses up and down several times in a very compact compartment."

Every module of the company's HIL-34 internal coating machine is able to handle up to 370 cans per minute.

"When a customer wants to run his line at 2,000 cans per minute, you would need seven or eight modules of our HIL-34 coating machine," states Allar. "Theoretically you can add as many modules as you want because all modules operate independently from each other. It becomes a question of properly handling the can streams. After the internal coating of the can you need to coat the bottom externally, at least in the case of steel cans. The modules of our HIL-15 coating machine handle 900 cans per minute each. In order to cure a waterborne coating you need to drive out a lot of water. To obtain a high-speed drying operation we then have the option to supply an induction dryer."

In the 1980s-90s many can makers, together with their coating suppliers, started programs to reduce VOC-emissions by replacing solvent-based coatings with water-based coatings. Can coatings can never do without a certain percentage of solvents, even waterborne coatings contain 10 to 15 per cent solvents. For the exact formulation of the coatings all can makers work closely together with their coating suppliers.

Allar says: "Our coating machines can handle both types of coatings. In fact, spraying water-based coatings is easier than spraying solvent-based coatings as the atomisation functions better for waterborne coatings."

Sprimag's HIL-70 internal coating with powder

Crucial for the spraying behaviour are the nozzles of the spray guns and they have improved a lot. "The nozzles define more than anything else the atomisation of the coatings used and therefore the full coverage of the can inside and the complete absence of pores and pinholes. The nozzles of today are much more precise than 20 years ago."

If the can substrate is steel or aluminium it does not make much difference to the operation of the coating machines. "We can easily handle both materials. However, we know that aluminium is gradually taking over as the preferred substrate for beverage cans," comments Allar.

Improvements and innovations

There are continuous changes to coating processes. As speeds of can production and filling lines keep increasing and the can walls get thinner and thinner, often a base rim coating is applied to the rim of the can's base. This applies to aluminium cans and the coat allows cans to move easily on conveyors and reduces abrasion on the base.

Sprimag is also a supplier of powder coatings. "Powder coating is one of a number of responses to use more environmentally friendly materials. Customers who produce collapsible tubes and monobloc aerosols are interested in this application. Our HIL-70 coating machine is able to coat both, thus reducing investment risks. However, for two-piece beverage cans powder coating is too slow. We are also quite active in the new market segment of aluminium bottles. It demonstrates that although coating metal packages has been done for almost 150 years, there are still new developments on the horizon and we want to take part in them," Allar sums up. ❑

Sprimag's HIL-34 internal coating machine is used on beverage cans