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## Doubling Spray Rates

New coating arm for tablet coaters

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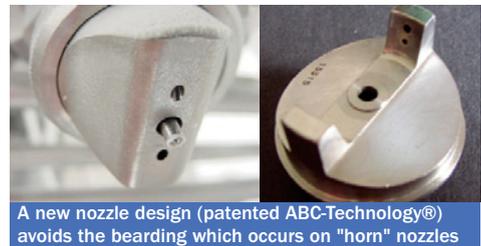
**In tablet production, coating processes require a lot of manual operation and experience: The spray arms and nozzles that are used have to be constantly checked, and the spraying process variables require careful adjustment. A new nozzle and spray arm concept now allows you to achieve considerably more efficient processes.**

The requirements for production machines in pharmaceutical processes are usually clearly defined: the final result must be able to be reproduced and the components must be able to be immaculately cleaned. These principles also apply to tablet coating. While the design of the drum hardly ever causes any problems, the situation is quite different when it comes to the coating arm. In order to achieve an even spraying pattern at each spray nozzle, the suspension is supplied (in Europe at least) via individual hoses. However, this has an impact on the set-up time as the complex spray arms are difficult to clean, hard to inspect due to the bent welded and screwed constructions and require time-consuming adjustment processes, which also makes them susceptible to faults.

This was reason enough for the specialists at the Coburg-based company Düsen-Schlick to develop a new spray arm concept which is based on a single manifold (manifold principle). In this concept, all the nozzles on an arm (the construction permits 2 to 9 nozzles) are supplied via one common manifold. This is a model that has been preferred for use on coaters for some time in Italy, the UK and North America. However, in contrast to these constructions, in which the supply line runs through the nozzles successively, the professional coating arm (PCA) works with nozzles placed on the supply pipe. "The decisive difference is provided by the even supply in comparison with integrated nozzles" states Stefan Gerstner, Technical Director at Düsen-Schlick. Gerstner explains "Practical experience has shown that when using this concept we can guarantee a maximum deviation of 4 per cent between the nozzles for both low and high viscosity tablet coatings." The system therefore has the same deviation range as an individual supply system via a hose.



The PCA (left) is considerably easier to clean and can be monitored better than single hose supply systems



A new nozzle design (patented ABC-Technology®) avoids the bearding which occurs on "horn" nozzles

A new nozzle and coating arm concept allows the performance of coaters to be improved

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## "The internal area of spray arms of conventional designs was largely hidden from the user"

Stefan Gerstner, Technical Director at Düsen-Schlick

### Cutting cleaning times in half

In addition to the accuracy, cleaning and handling are also of crucial importance in practical use. „Assembly and dismantling take just half the time required with a conventional coating arm“ explains Gerstner. In order to take the PCA apart, you just need to remove two fastening screws at the ends. The nozzle itself is an interesting detail of the spray arm: the conventional flat jet nozzle, which is

#### DECISIVE FACTS

##### For operators

- The PCA concept for coating arms is based on a central manifold.
- The individual nozzles are supplied with the same level of precision as conventional nozzles which each have their own hose supply.
- The elimination of hose couplings and fittings means that cleaning is easier and assembly and dismantling times are cut in half.
- The spray rates can be increased by 30 to 40 per cent.
- The modular construction means that the number of nozzles can be varied.
- The system can be retrofitted onto existing coaters.

characterised by two „horns“ at the front of the nozzle, has been replaced with a new design. In the ABC (anti-bearding cap) nozzle, the rounded shape reduces turbulence and as a result the dust particles circulating in the coater (tablet debris) do not build up on the nozzle (bearding). This means that the air ducts remain free and produce a consistent spraying pattern. „We have determined that the interruptions that are otherwise common in the coating process to allow for nozzle cleaning can be almost completely eliminated“ reports Gerstner. „The construction has already proven its worth even in complex applications such as the use of methacrylate and cellulose coatings.“

The pharmaceutical company Henning Arzneimittel, based in Flörsheim, became the first end user in Germany to completely convert its tablet coaters to the PCA concept. They have gathered experience on IMA coaters (GS 600, GS 300) over eighteen months since the end of 2004: The function of the coating arm was safeguarded over the entire access time. There was just a light coating of dust in the front area of the nozzles, but no actual build-up in the nozzles. After six hours spraying time, rinsing was carried out with water and cleaning agents and no debris was recorded in the ducts. In addition, the tablets were also well coated. "It was possible to double the flow rate whilst retaining the same level of tablet quality, as the traditional "horn" nozzles were operated with just 75 g/min due to their susceptibility to errors" says Gerstner. "The even ellipses of the spray and the continuity of the PCA processing control mean that the spray rates can be increased by a total of 30 to 40 per cent." As a result, Henning Arzneimittel revised their formulations during the revalidation. In addition to reducing the susceptibility to faults of the previously used processes, it was also possible to decrease the cleaning time by

50 per cent. Gerstner explains "The internal area of spray arms of conventional designs was largely hidden from the user. These dead areas represent a risk to the process because the sedimentary pigments become loose after cleaning and can block the nozzle hole." In the PCA, precisely adjusted cleaning needles ensure the nozzles are clean.

At Degussa Röhm Pharma Polymers in Darmstadt, Germany, the new manifold arms have also made it possible to solve the problem of sedimentation of methacrylate coatings with high proportions of talc in the spray arms of conventional coaters. The visualisation on a Plexiglass PCA led to new findings. Gerstner explains "The desired success was brought about both by the conversion to the lubricant glycerine monostearate and by an increase in the flow velocity."