

Faster Colour Changes with Pigging System

By adding a pigging system to its paint metering pumps an automotive supplier was able to reduce wastage of paint and rinsing agent and shorten its colour change times. A modification to the rinsing agent supply unit allows for simultaneous colour changes in all the special paint stations, which makes the paint shop even more flexible.

Frank Reiter



Special paint supply stations after conversion.

Weiss automotive GmbH, which is based in Appenweier (Germany), primarily supplies customers from the premium automotive segment with painted plastic components such as bumpers, rear spoilers and other add-on parts. The specific challenges faced by the company are the small batch sizes and the need to process special colours and effect paints that are designed for volume production. In this case, paint costs of up to 150 euros (around 175 US dollars) per kilogram are not unusual. For this reason, reducing paint waste and speeding up colour changes in the spray booth, which is fitted with two robots, are important considerations.

Each of the robots is equipped with an atomiser and uses three gear pumps for metering purposes, which process plain colours, metallic colours and pearl-effect paints separately. There are a total of eight special paint supply units (2 × pearl, 3 × plain and 3 × metallic) in the nearby paint mixing room. The solution developed by Reiter was installed as long ago as 2001 and at the time was highly innovative. It automatically cleans the station and returns the materials to the ring line using compressed air.

Gradual upgrade over six months

The first meetings about the possibility of improving the existing system were held in May 2019. The aims of Weiss automotive were:

- To reduce paint wastage
- To reduce rinsing agent wastage
- To shorten the colour change times and increase the flexibility of the system

The piggable colour changing unit automatically returns the paint within the ring line.

The plan was to continue using the existing pump stations. When the order was placed at the end of July 2019, it was agreed that the upgrade would be implemented in two stages. Firstly, the two stations for pearl effect paints were converted within a week in early October. The goal was to gain experience of the new systems without interrupting production. The new stations met the requirements of Weiss automotive from the very beginning, which meant that the remaining six stations could be upgraded at the end of 2019.

The conversion package consisted of pigging sending and receiving stations, new piggable colour change units, piggable ring lines, flush valves, pigging sensors and modifications to the control unit. Reiter worked together with Weiss automotive to develop the new processes for the system.



© Reiter

As a result of the use of the existing components and control unit, the investment involved was much lower than for a complete new system, which means that the upgrade will pay for itself relatively quickly.

Automatic paint return system

One of the key features of the control unit is the option of selecting individual processes for each station. The result is that the ideal

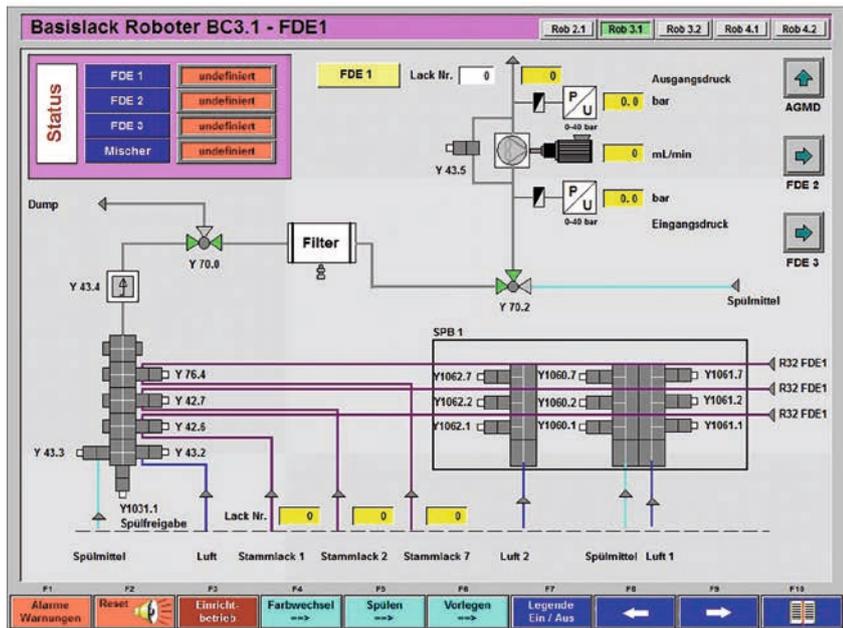
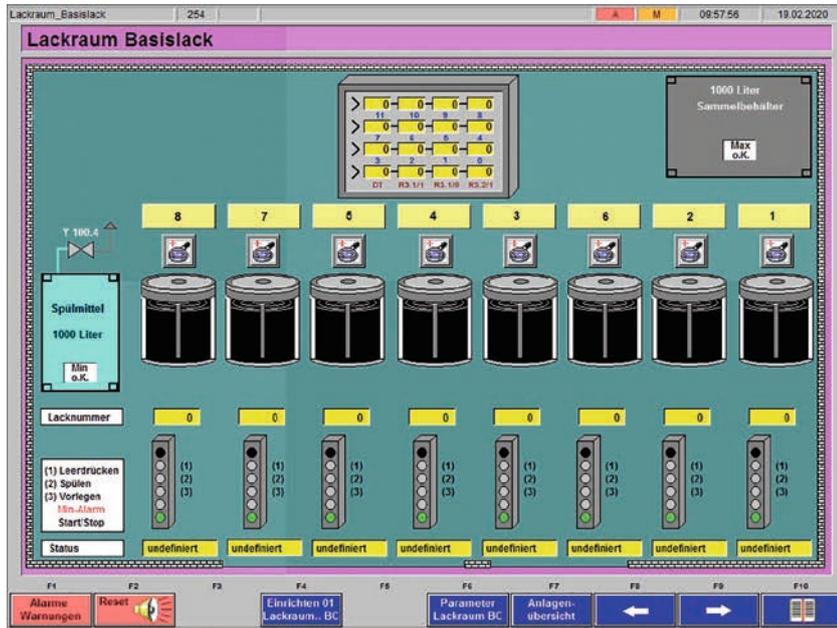


Diagram of the paint room (top) and the base coat metering unit (bottom).

process can be selected on the basis of the length of the ring line and the viscosity of the paint to give the best possible results. The simple and cost-effective paint supply system allows the paint to be returned automatically within the ring line. During colour changes, the operator connects the feed line to the rinsing station. The paint is automatically returned and the ring line is cleaned. After this, the new colour is connected from the delivery container and the ring line is refilled. The existing PLC enables the return and cleaning cycles to be adapted to each system depending on the length of the line and the viscosity of the paint.

Short pigging times even for highly viscous paints

The high viscosity of the plain-coloured paints when compared with their metallic and pearl equivalents results in increased consumption of rinsing agent for cleaning the pumps and longer run times for the ring lines. In order to keep the wear on the pigs to a minimum, they must travel at a relatively low speed into the receiving station. For this reason, the stations for plain-coloured paint have an additional sensor which gives the option of enhanced pressure control and short pigging times even for highly viscous paints. The addition of functions for pausing and continuing the cleaning process in the local control unit provides practical help for the operators in the day-to-day running of the system. Weiss automotive reports positive experiences with the new pigging system and its implementation in their paint shop. The modification of the rinsing agent supply unit allows for simultaneous colour changes in all the special paint stations which makes the painting system even more flexible. //

Colour changes in the mixing room	Old system	Pigging system	Unit
Paint wastage for each colour change in the special paint supply system	1.2	0.15	l/kg
Solvent wastage for each colour change in the special paint supply system	8-12	3.5	l
Time required for a colour change in the special paint supply system	10-12	6	min

Table 1 > The conversion made it possible to reduce wastage of paint and solvent and shorten colour change times.

Author

Frank Reiter, managing director
 Reiter GmbH + Co. KG Oberflächentechnik
 Winnenden (Germany)
 info@reiter-oft.de
 www.reiter-oft.de