



Highly automated process and quick color change

# Powder coated tool cabinets for Formula 1

In Formula 1 it's all about speed. Also the expensive maintenance tools have to be quickly accessible and securely stored. The Swiss-based company Lista AG supplies Formula 1 teams with such powder coated high-end cabinet systems.

## Keywords:

Tool Cabinets, quick color changes, robot, inside coating

When you watch TV transmissions during the Formula 1 season, watch out for the tool cabinets in the boxes of teams such as Ferrari, Sauber, McLaren or BAR-Honda. Nine out of ten Formula 1 teams rely on powder coated cabinets made by Lista AG based in the Swiss town of Erlen.

Do powder coated tool cabinets really comply to Formula 1 standards? There is no doubt about it, they do! In Erlen, you can find one of the most modern

and unconventional powder coating plants.

## Saving space and time

Office furniture, cabinet systems or workbenches – all modular Lista products save space. The single components allow flexible adaptation to the required functions and working conditions ensuring valuable stored articles are protected from damage whilst providing ease of access and simplified workflows.

## ADAPTING PRODUCTION PROCESSES TO CUSTOMER NEEDS

Shorter delivery times, special customer colors and increasing competition challenged Lista to adapt its surface treatment process to the changing market needs.

The production manager, in charge of surface technology in segment B at Lista, explains how everything began: "Lista did pioneering work when, in 1990, it started to exclusively use solvent-free water-based lacquers, which were recyclable. This system was absolutely revolutionary at that time. The installation had to be replaced even though it still delivered excellent results in the fully automated operation." Two options were discussed: a new water-based lacquer installation and a powder coating system. For several years, powder coating technology has been successfully used in various plants.

The objective was to realize a flexible installation including one main and one auxiliary booth as well as a power and free conveyor system.

## UNUSUAL REQUIREMENTS AND UNCONVENTIONAL SOLUTIONS

In the tool cabinet segment, Lista customers can choose any color available. For the Mc Laren Formula 1 team, for instance, the plant in Erlen manufactures cabinet systems in Paragon white. This shade is specially matched with the colors in the UK-based plant and currently used by Mc Laren.

As powder manufacturers are now able to supply small quantities, Lista opted for a powder coating system, which responds best to the new challenge: any



The gun configuration and the use of various kinds of independent axes allow simultaneous coating of the lower and upper parts of the cabinets hung on double hangers.

color at any time. The entire new powder coating installation is located on two floors, pre-treatment, drying and curing oven as well as the absolute filters are positioned on the upper floor.

Why choosing such an unusual layout? Plant Manager: "Well, our idea was somewhat unconventional. We also had to convince the management, that we intended to increase our production volume while keeping the old cramped space for material flow reasons. To realize this, we had to position the installation on two floors."

But why is the pre-treatment located above the powder coating? This is a

rather unusual decision, isn't it? Plant manager: "That's true, you will probably only find a few similar concepts. But we had already gained experience with two two-storied powder coating installations, even if the booths and electrostatics in these installations were located on the top floor. During the summer months, the heat causes us problems. That's why we decided to move all automated processes, that is to say pre-treatment, ovens and storage places onto the upper floor."

As the whole layout also required a space-saving transport system, Lista opted for a power and free conveyor. But how do these big, heavy workpieces



reach the upper floor and the finished parts the lower? Lista solved this problem the smart way by installing a vertical lift.

Plant Manager: "Initially we were afraid that the powder might detach from the coated parts due to sudden movements, but our doubts were unfounded. The vertical lifts perform smooth and jolt-free movements despite their heavy loads."

#### FULLY AUTOMATED PRE-COATING WITH A PORTAL - ARTICULATED ARM - LINEAR ROBOT

The powder coating installation is subdivided into two lines: one automated and one manual coating line, both include a fully equipped automated booth. At Lista, the difference between automated and manual coating lies in the type of pre-coating being used. In the manual installation, pre-coating and touch-ups of mainly small production runs are done manually, whereas in the automated system these are carried out by a portal robot.

Is the use of a portal robot expensive and does it require special know-how in terms of programming work? Burch: "It is true that the robot requires good programming knowledge. But we can say today that our employees are able to program the robot without any problem. Once the programming has been learned, it is very user-friendly. Moreover, we have the possibility to set up our programs in 3D on the screen."

The technical team also opted for a portal robot, because it can travel with the objects while, in terms of the height and depth of the parts, flexibly working off longer distances with high speed. Conventional articulated arm robots only cover a limited motion area unsuited for the geometry of the big parts hung on double hangers.

With the robot, Lista coats the inside corners of four cabinets on one double hanger. The robot reaches into the cabinets where it coats difficult welds and edges. 30 basic hangers with object dimensions of maximum 800 mm depth,

2000 mm height and 2500 mm length can be worked off per hour.

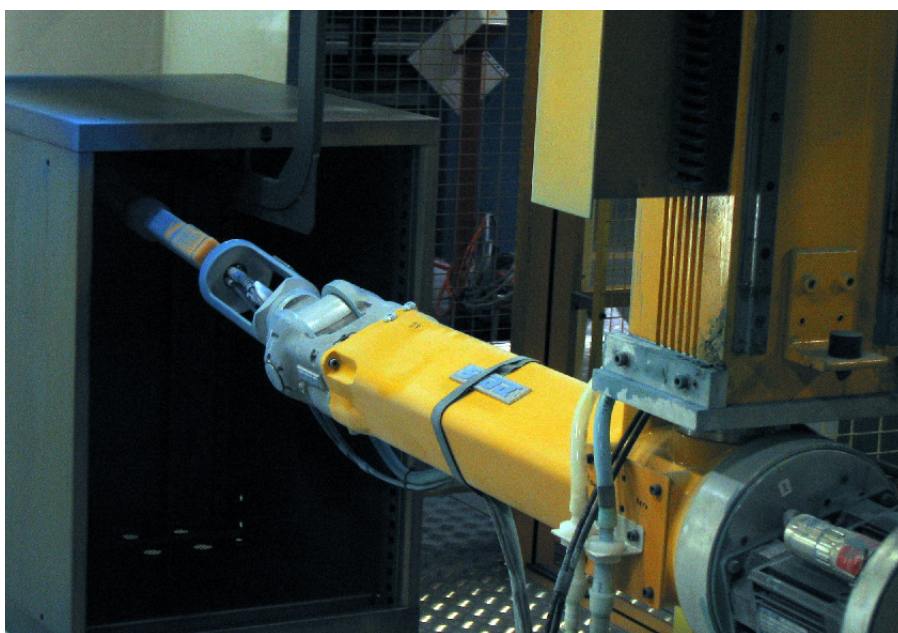
#### AXES CONTROL UNITS AND RECIPROCATORS

After the pre-coating process, outer and inner coating of the cabinets is carried out by MagicPlus, the quick color change system from ITW Gema. Seven reciprocators with five autonomous depth axes take over the complete coating of the workpieces. Burch explains the advantage: "The upper surface, that is to say the top of the cabinet is the most important area of the exterior of the cabinet. It is always in view. That's why we initially planned to separately coat the bottom and top. However, tests in the ITW Gema lab in St.Gallen, Switzerland have shown, that bottom and top can be coated in one work cycle by using an automatic gun with splash plate."

The powder gun OptiGun with splash plate travels into the narrow space in between the cabinets hung one over the other, while various guns simultaneously take over the inner and outer coating. The PC control module autonomously coordinates all coating parameters, whereas the touch screen clearly displays at all times in which mode the axes and guns are running.

In special cases, the operator can use the manual coating station for corrective touch-ups.

"Despite the high number of guns and the size of the booth, color changes can be carried out in 15 to 20 minutes. In the manual installation, the operators change it within 5 minutes", reports Burch. The robot cleans itself in a separate cleaning station.



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Lista works with 15 to 20 shades a day, the whole color pallet includes 150 colors. Plant Manager : “We are able to offer our customers any color they want. That’s why a quick color change is so important. But with all this speed it is even more important to have no color contamination throughout the whole powder circuit.”

Inordertomanagethesecomplexcoating processes, we need precise control units that guarantee reproducible results regardless of environmental influences and seasons. This is accomplished by the control units OptiTronic coupled with the electrostatic guns OptiGun and the precise supply from the powder center. Because for subsequent deliveries, the red should be still Ferrari red.

#### CONCLUSION

“Such a complex coating installation is not a coffee machine that you simply pull out of the box and plug in. From the idea to the planning stage and realisation, all partners involved in the project were challenged to live up to this lofty mission.

The result is convincing. The layout of the entire installation perfectly fits the production process, the coating installation with the robot delivers the desired results and we were able to save one operator per shift. From today’s point of view, we would do it, apart from a few small details, in exactly the same way.”

#### LISTA COMPANY PROFILE

Lista is an independent family-owned company producing high quality workplace and storage systems as well as office equipment for international markets. The group is based in Erlen/Switzerland, has more than 1000 employees and is represented in over 40 countries world-wide.

Lista stands for organised and tidy work places in workshops and offices. Lista products comply with the highest demands in respect to quality, design and functionality and thanks to their modularity, they can cover customer needs in the best possible way – as the Lista claim says: “Making Workspace Work”.

The company has been founded in Herisau/Switzerland in 1945 by Alfred Lienhard and produced simple steel tube products and garden furniture. As soon as 1954, the first drawer cabinet had been manufactured – to date the core product of the Lista range.

In the late sixties Fredy A. Lienhard, son of the founder, ventured to the USA and set up the Lista International Corporation in Holliston, Massachussetts, which to date produces workplace and storage systems for the North and South American market. Following an increased demand from the market, Lista supplemented its product range with office furniture in 1981 which is manufactured at Lista’s Swiss factories in Degersheim and Arnegg. With the acquisition of the German representation C&A Dick in the early nineties, Lista developed an additional production site for workplace and storage systems in Bergneustadt near Cologne. These products are mainly distributed in European countries.

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