

# Efficient Drying of Exterior Truck Parts

Drying and flashing off water-based paints is a time and energy consuming job to do. The Swedish commercial vehicle manufacturer Scania gives an example of how much a change in the drying process may improve the situation. They retrofitted their Meppel, Netherlands, facility implementing efficient technology at reasonable cost and without extensive rebuilding.

The Swedish truck manufacturer Scania's requirements for the drying process are perfectly clear – efficient, low temperature drying shall enhance adhesion of water-based paints on external truck surfaces. The Scania Group's company based at the Dutch city of Meppel was established in 2005. It produces paint coated exterior parts for Scania's European truck assembly facilities at Zwolle (Netherlands), Angers (France) and Södertälje (Sweden). A total of 22 robots, in three

lines, apply paint to plastic parts for the cab and chassis in the colours desired by the customers. Scania offers colours in more than 500 hues. They use a water-based 1K metallic base paint for their exterior truck parts. This paint requires optimum drying conditions. "The goal was to improve adhesion by implementing an efficient drying process", says Anton van Steeg, Scania Meppel Senior Paint Specialist and Project Manager co-responsible for the painting process. In December

2015 they decided to make additional investments in hardware to improve the painting process. Their headquarters in Sweden recommended to further reduce the residual moisture content of the base paint coat prior to applying the clear top-coat. Initial tests had revealed residual moisture contents of between 10 and 12 percent.

## Space-saving Solution without Rebuilding

Scania had initially considered investing in a new oven. The idea was finally dismissed for various reasons including a reluctance to make larger investments or to rebuild the facility. Also, space restrictions precluded extension of the facility so that any modification had to fit in the existing area. Anton van Steeg conducted an online search to find Harter, a manufacturer of heat pump based condensation drying systems with a record of successful paint coating applications – exactly what van Steeg was looking for.

Following successful drying tests in the Harter pilot plant station at Stiefenhofen, Germany, two systems were acquired and commissioned. Scania invested in two smaller (Airgenex Type 9500) rather than



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Scania paint exterior truck parts at their Meppel (Netherlands) site for assembly at their three European assembly facilities located at Zwolle (Netherlands), Angers (France) and Södertälje (Sweden)



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Two compact condensation drying systems provide adequate air-conditioning for the painting process. Dry air is passed over the items to be dried absorbing humidity in the process.



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To minimize water input into the downstream paint coating process parts are finish shammed if required.

in one big condensation drying system. The systems are sized 2400 mm long, 1100 mm wide and 1800 mm high, and have a power rating of 10.95 kWh each. “If we had bought a single system it would have been too bulky to be taken to the upper level at all” explains van Steeg their choice in retrospect. Also, doors, hallways and corridors are narrow enough to preclude the installation of a single, big system. “This was a smart way of conveniently achieving a good result.”

### Processing 900 Skids a Day

The parts are first mounted on skids. The Meppel site processes almost 900 skids a day. The product portfolio includes plastic body attachments such as fender fairings, side skirts, headlamp housings or wheel arch liners. And also cab, deflector and grill parts from SCM composite materials. All such parts must be delivered by the facility either painted or unpainted in accordance with internal production control requirements. These parts undergo processing at three levels from drying ovens at the top level, through painting lines at the medium level to cleaning, picking & packing and shipping at the bottom level. Prior to paint application, the parts are cleaned. Scania’s painting is a fully automated process in which 22 robots apply paint to the parts. On the T1, the painting line for structured chassis parts, all parts have a primer coat plus a subsequent solvent-based topcoat applied. The two other lines, T2 and T3, are used to finish coat

all cab and reflector parts primer coated by external sources. On the T2 line, parts have a waterborne base coat and subsequent clear topcoat applied. The base coat may be omitted so that only coloured topcoat is applied. The T3 line is used to apply solvent-based paints. Once paint coated, the skids are passed through the drying ovens and a cooling zone. In the “Inspection and Repair” area, the coated parts are thoroughly inspected and any non-conformance with the desired surface quality touched up.

### Drying at Low Temperatures

The Airgenex heat pump based condensation drying systems are vital for Scania’s processing. The basic design of the system was developed by Harter more than 20 years ago. It has since been employed in various industrial applications. The system enables drying at low temperatures which makes it ideally suited for drying paint coats. Paint coated surfaces dry from the inside out in a uniform way. Dry and, thus, unsaturated air is passed to the flashing-off zone where it absorbs moisture. The moist air is then routed to the dehumidification module where it is stripped of the moisture it carries. Excess water together with the solvent is condensed and collected in a separate container. This way, the relative humidity in the flashing-off zone may be reduced from 65 to 23 percent. Drying times are very short due to the underlying physics of the process, i.e. water is absorbed from the paint. Chemi-

cal curing may begin once the water is flashed off the paint. Condensation drying is effected in a closed system with no exhaust air. Constant drying parameters independent from the elements ensure constant drying quality. The project was executed in accordance with a tight schedule. After initial go-ahead in December of 2015, the system was due for implementation as early as in August of 2016. Scania’s requirements were met, again. “Harter could undertake to realize the project in such short order” says van Steeg. The moisture in the flashing-off zone was reduced from 65 to 23 percent. “This helped to further improve paint adhesion. Now that moisture is effectively removed the curing oven works much better. We obtain better results using the same temperature”, says van Steeg to sum it up. Also, the targets specified by Scania of Sweden are fully met. //

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