

Industrial Paint Coating Practice

Energy-efficient Drying of Paint Coated Sensor Housings

SICK dries water-based paint coats at low temperatures

The company has realised two paint drying projects in co-operation with drying system manufacturer HARTER. Even RFID technology was used.

SICK of Reute, Germany, a manufacturer of sensors and sensor solutions for industry, has switched from solvent-based to water-based paints. They realised two interesting paint drying projects in co-operation with drying system manufacturer HARTER of Stiefenhofen, Germany.

The first project was the refurbishment of an existing drying system for water-based paints. HARTER subjected paint coated sensor housings to series of tests in their in-house pilot plant station for gloss level, corrosion resistance and block resistance. The tests demonstrated that HARTER's low temperature drying had no adverse effects on the final product or the production process. So, nothing stood in the way of changing the process and using a HARTER drier.

New Production Line

At the same time, SICK needed a drier for an entirely new production line. The drying parameters - such as humidity, temperature, airflow rate and



The "Airgenex" combined system is used for air drying and curing

Source (two images): Harter

air speed fit for the sensor housings to be processed in this line had already been determined and recorded in the first project. For SICK, block resistance had topmost priority. HARTER provided their "Airgenex" condensation drier for this purpose. "Heat pump based condensation drying" is a technique using extremely dry, unsaturated air in an energetically closed system at low temperatures. The dry air helps to get rid of

the water in the paint at low temperatures while preventing superficial cross-linkage of the paint. Blistering, bubbling, or cratering in the drying process may thus be precluded.

As a result, the paint coated surface becomes uniformly dry. The water-based paint dries evenly from the inside out. This condensation drying technique combines gentleness of drying and short drying periods. It is suitable for all water-based paints and subst-

rates. Low temperatures do not induce stress or leave residues in the items being dried. Drying in a closed system also means independence from the environment and the seasons as well as high energy savings.

Air Drying and Curing

Today, SICK uses a combined drier in their new production line. The drying chamber is 4.3 m long, 3.0 m wide, and 2.5 m high. It provides the space required for two drying

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zones, namely for air drying and curing. Attached to the air drying zone is the "Airgenex"-dehumidification module that controls the ambient conditions in the drying chamber and in this case it provides the unsaturated, dry air.

The paint curing oven is heated conventionally. The entire drying system has a power rating of only 45 kW. Sensors having undergone paint coating are placed on trolleys for processing in the drying system. A floor transport system conveys the trolleys through the drying zones. Once the doors have automatically closed, the air drying process commences. The water evaporates at 40 °C within 20 minutes. Subsequently, the paint cures at 80 °C for 40 minutes. Upon completion of the process, the trolley is automatically removed from the drying chamber.

Special Sensor Technology

Being specialised in sensor technology, SICK provided a special feature for the process. Each trolley has a so-called RFID transponder attached. The standard compatible transponders (UHF; ISO/IEC18000-63)



The trolleys are conveyed into the drying chamber

may be mounted on metallic surfaces and are set, for this application, to a read range of about 1 metre. SICK uses a RFU620 reading system that ensures reliable and positive

tracking and tracing of the target object. The mechanically mounted tags may store various pieces of information, for example which line will continue to process the items subsequently. There is a receiver installed at the drying system that passes an optical and acoustic signal to the relevant workplace. The worker there has now 20 minutes time to collect the trolley from the drier. The interaction of these high tech devices ensures a smooth and stress-free process for the hardware and the employees of the German sensor manufacturer.

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