



Leuze lumiflex gives Peugeot shine with safety

Based in Bietigheim / Bissingen, Baden-Württemberg, the company Dürr Systems GmbH Lackier-technik [Dürr Systems Paint Technology Co. Ltd.] set up a number of assembly lines for the spray-painting of car bodies at the Peugeot works in Mulhouse, France.

After the car bodies have first been primed with a basecoat, further layers of paint are added in the chosen colour. After the paint has had sufficient time to dry, a clear lacquer is applied to complete the process.



From treatment with the basecoat right through to application of the final layer of clear lacquer, the car bodies are moved forward by a chain conveyor running at constant speed.

In each painting zone, accompanying the car body on both sides, one or more painting robots will be working on the application of the paint, while the forward movement of the car body continues uninterrupted.

As if controlled by an invisible hand, the robots travelling in parallel to the car body divide the work between them. They may have to get out of one another's way, if for example a robot is applying paint to the rear of the car just while another is painting the front, or if one is working "inside" while another is working at one remove "outside". In one section of the line there will be as many as six high-speed rotary atomisers working on one car body simultaneously. A PLC system controls the transport of the car bodies and the painting robots themselves, and of course also ensures that they do not run into one another.

In normal operating conditions the entire painting plant of course works on a fully automated basis. Because of the power-driven painting robots and the moving stream of car bodies, no employees can enter the area. Safety light curtains from Leuze lumiflex are responsible for securing the access. If an illicit entry is effected, or if a person enters the forbidden zone in error, the system will automatically cut out.

When the Emergency Stop brings the system to a halt, the conveyor chain at once stops moving the car bodies. In just a few tenths of a second the robots are brought to a standstill in a controlled manner. This ensures that when the plant starts up again it will be possible for the painting operation to go on seamlessly – in the most literal sense of the word – and without the least detriment to quality.

But inasmuch as the car bodies, as they enter and leave the painting zone, are likewise intruding on the same safety light curtain, a further technological resource is needed. This is the muting function.

This involves the positioning of additional single sensors ahead of and behind the actual safety light curtain, in the direction of the flow of materials (car bodies in this case). A human being casts





a different shadow from a car body, and the sensor is able to distinguish between the two events on the basis of incoming signals. The car body is allowed to pass. A person entering brings the system to a halt.

In addition, position-monitored swing doors secure the intervening space between the car body outline and the wall of the cabinet in the course of the muting procedure.

Because of the paints and solvents used at this plant, and the risk of explosion that arises from so much gas and dust, appropriate safety requirements have to be defined for the electrical equipment. This also of course applies to the safety light curtains.

Leuze lumiflex has the exact range of products that is required to ensure complete conformity both with the new Explosion Protection Directives (ATEX 94/9/EC), the Machine Directive 98/37/EC and other directives relating to low voltage and electromagnetic compatibility.



In the basic painting area (Ex zone 2) the Leuze lumiflex COMPACT C30-1500 EX2 type 4, with 30 mm resolution and a protective height of 1500 mm, is used. This is an electrical operating fixture of Device Group II, Ex category 3. A special front plate of bonded glass ensures that even if a hefty knock is delivered by some external agent, the protective class IP 54 will still be maintained as a minimum. The surface temperature of all components in the interior of this safety light curtain remains below 135 degrees Celsius. Furthermore, there are no components located in the interior (such as relays) that could produce sparks. The ignition protection label "nA" here stands for non-sparking.

In the area where the clear lacquer is applied, on the other hand, based on the same European Directives for zone 1, the Leuze lumiflex safety light curtains of the COMPACT EX 1 type 4 series that are used – likewise with 30 mm resolution and a protective height of 1500 mm – come into the category of electrical operating fixtures of Device Group II, Ex Category 2.



Compact
450-ex

The active safety light curtain is encapsulated in a pressure-resistant glass cylinder, which in turn is cemented into the end pieces at the top and bottom without the use of silicon, likewise in such a way as to resist pressure.

A theoretical explosion within the glass cylinder housing would be fully contained. In keeping with Ignition Protection Class d, no sparking agents can escape to the exterior. The COMPACT EX 1 type 4 range of products has been subjected to EC Prototype Testing. And incidentally – the intelligent safety interfaces with a muting function are also supplied by Leuze lumiflex. These are accommodated outside the Ex zones in the switch cabinet.

Equipped with Leuze's safety equipment, the Dürr painting plant at the Peugeot works in Mulhouse is designed to turn out as many as 1800 vehicles in a day.