Special LED lights for inspection tasks

"Standard solution" with special features

LED lights offer an immensely wide range of uses for industry. If, however, a standard solution needs to be transformed into a special light with specific features, specialist from the field are called for.

Alternatives needed

A company that manufactures meal trays made of aluminum for the food industry needs to have high standards for the quality of its products. For this reason, a manufacturer of such meal trays developed its own inspection stations to examine the finished products for damages.

To identify even the smallest cracks or holes in the material, a visual inspection is performed at these workstations with backlighting in a kind of darkroom. "Previously, incandescent lamps were used for this purpose. With the EU-wide ban on incandescent lamps at the end of 2012, it was time to start thinking of alternative lighting at the inspection stations as well," explains the company's master electrician, who works in the area of maintenance.

Solution with small detours

The decisive impulse for a suitable solution ultimately came by way of a machine light. The manufacturer of aluminum trays has been familiar with ipf electronic for decades as a sensor specialist; a number of projects had even already been realized in this area. "When we learned that the company from Lüdenscheid has offered a new product division with LED lights for industrial use since the end of 2010, we inquired about a solution for lighting the machine room of an aluminum press." A suitable LED light, which ipf electronic was able to present for this task, led to the idea of using a similar solution for the inspection stations as well. The master electrician adds: "The idea came about mainly because we need to inspect – among other things – large trays with a length of 600mm. With a standard light, it is not possible to illuminate the large bottom side of an aluminum tray in order to detect defects in the backlight."

Breakage resistance an absolute "must"

Because the user, as already described, manufactures for the food industry, it was decided to use an LED light in aluminum/polycarbonate housing. "In the event of damage to the light, no shards or splitters may land in the vicinity; the cover of the LEDs could therefore not be made of glass, but rather from an unbreakable material such as polycarbonate."

From the point of view of the master electrician, another decisive safety aspect arose with respect to a workplace for persons in terms of the supply voltage: "while standard lights are operated with 230V,

an LED light requires a supply voltage of just 24V and, as a result, is comparatively safer in operation."

"Flash function" and other high requirements

One of the most important requirements – a type of "flash function" – was, however, not integrated in the standard version of the LED light. The more detailed description of the inspection process makes clear why this function is so important in connection with the visual check. For the product inspection, an employee places an aluminum tray in an opening provided for this purpose at the inspection station. Located below this opening is the light, which, controlled via a light barrier, does not illuminate until the tray is positioned flush in the opening. If the light, which is incident on the bottom of the tray, shines through the material, the tester can identify even the smallest defects in the material in the completely dark room, e.g., holes the size of a pinhead or extremely fine cracks, and then reliably sort out NOK products. When an inspected tray is removed from the opening, the light must switch off immediately. "That is absolutely necessary in order to keep the tester from being permanently blinded by the backlight. Because the workers work on a piece-rate basis, the lights must also be designed for rapidly switching on and off over many cycles per minute as well as over many work shifts," says the master electrician.

Specialist for more than sensors

With a view to these specific requirements, the engineers from ipf electronic modified the LED lights and integrated a flash mode using special ballast electronics. In this mode, the light is supplied as usual with 24V but is switched on and off via a separate 24V input. This solution in the form of a HART circuit ensures not only the reliable operation of the light under the required conditions, but also guarantees a long service life of the LEDs - and does so in spite of particularly demanding conditions.

Long-lasting and always available

The user has now been using the LED lights from ipf electronic for three years without problem. The master electrician, who, as a maintenance technician, also assesses the solution in terms of "availability", gives a correspondingly positive summary: "With the LED lights from ipf electronic, we have now found a long-lasting solution that is suitable for use in the food sector. The light is based on a standard product and is thus always quickly available and still satisfies our very special requirements at the inspection stations."

Image captions:

LED special light ipf_01: Illumination of an aluminum press with an LED light from ipf electronic ultimately led to a special solution for inspection stations.

LED special light ipf_02: Located under the opening at the inspection station is the LED light, which is switched on and off via a light barrier. To detect even the smallest defects in the aluminum trays, the lights must have an emission angle of 120° to illuminate the entire tray bottom - another requirement that ipf electronic took into account in the realization of the special solution.

LED special light ipf_03: The LED light immediately and clearly shows: the tray is damaged and needs to be sorted out.