

CAYENNE D- & RED CHILI D

Quartz Flash Cure Unit - M&R

M&R is the world's largest manufacturer of screen printing equipment for the graphic and textile industries. They produce a wide array of screen printing products and OEM screen printing parts at facilities in Glen Ellyn and Niles, Illinois, USA and Wojnicz, Poland. The company has distributors and skilled technicians in over 40 countries on six continents.

Quartz Flash Cure Unit's

One of the products M&R develops and manufacture are Quartz Flash Cure Unit's. These unit's will be used for curing the screen printed t-shirts. Their new, most sophisticated and versatile freestanding quartz flash cure systems are the RED CHILI D and their CAYENNE D. Both offer the latest innovations in screen printing equipment by providing significantly higher speed, without compromising quality of output.



Challenge

Higher speed requires higher intensity radiant lamps and/or more densely packed lamps, which produce more heat in the area of the sensor and can restrict the view of the t-shirt from the sensor location above the lamps. Increasing the speed for M&R's RED CHILI D and their CAYENNE D. brought three main problems.

The intense heat from the lamps conducted to the area of the sensor causes the sensor to exceed its specified body temperature limit of 100°C (212°F), which can cause failure of the sensor. Once the power of a machine has been shut off after operating normally, the residual heat from the lamps and its associated components are that hot to cause the sensor to exceed its body temperature limit.

The restricted view of the T-shirt target caused by the narrow packed lamps causes the sensor signal to be influenced by the hot lamp parts and viewed by the sensor. This results in an excessively high temperature indication for a few seconds when the lamps are off.

The challenge for M&R's RED CHILI D and the CAYENNE D. is to increase the speed for curing the screen printed t-shirts, without surpassing the maximum body temperature of the sensor that influences the sensor signal.

Solution

The solution for M&R's RED CHILI D and their CAYENNE D. has been found in the use of a completely customized IRT/c sensor. The teams of M&R and Exergen were able to tackle the problems by working closely together.

The first problem, overheating the sensor during operation has been solved in a simple, cost effective manner. Using a baffle system, more air will be directed from the fan to the sensor area. This causes the temperature to drop to 70°C (158°F).

To prevent overheating of the sensor after shutting down the power a fan will be turned on to cool the sensor. But in case that all power is shut down by storm or an accident, they came with an other solution. They

clamped a simple aluminum heat sink of sufficient mass to the sensor to absorb the conducted energy without raising the temperature of the sensor excessively.

The last challenge has been solved by shrouding the field of view of the sensor. The shroud becomes part of the optical system for the sensor as well as preventing any direct lamp energy from entering the sensor. The wider field of view is effectively funneled by the reflecting shroud, making a wide area measurement, which is more desirable from a quality control perspective. Besides shrouding the field of view of the sensor, the double walled shroud insulate the inner surface from the intense heat of the lamp.

Benefits

The IRT/c sensor from Exergen Global makes it possible to measure the exact t-shirt temperature during the curing process, with a resolution approx. of $0,0001^{\circ}\text{C}$ (0.0002°F) and a repeatability error of $0,01^{\circ}\text{C}$ (0.02°F).

This ensures that M&R knows exactly when to remove the t-shirt. Because of the solutions that the teams of M&R and Exergen brought, M&R is able to increase the intensity radiant lamps, which produce more heat. Doing this and being able to control it, M&R can increase the speed of the curing process.

