Infrared radiators quickly and reliably dry silicone coatings on plastics tissues

Heat Treatment. Coated safety materials, such as those used e.g. in airbags, have to meet high quality standards. When infrared radiators are used for drying and preheating, the process can be controlled individually and the scrap rate diminished significantly.

Drying with Infrared Radiation

Airbags International in Great Britain produces airbags and other safety materials from polyamide 66 (PA66). Coating them with silicone reduces surface friction and allows the material to unfold later in a fraction of a second.

However, PA66 is hygroscopic, e.g. it draws water out of the environment and may achieve a humidity content from 3 to 5 %. Before coating, this percentage has to be reduced to ensure that the silicone adheres well and to achieve the optimal surface quality of the tissue.

The drying and preheating processes necessary for this procedure are performed and controlled with carbon infrared systems by Heraeus Noblelight GmbH (situated in Kleinostheim/Germany).

The tissue's surface temperature is measured with optical pyrometers. The next step is to intentionally adjust the infrared radiator's power so that the material may dry optimally without sustaining heat exhaustion.

According to a statement by Mark Smith, project engineer at Airbags International, the infrared module needs only little additional space. Thus, it can be integrated into the coating equipment without difficulty. Fire damage, which can occur in other drying systems, is precluded since the infrared radiation of medium wave length warms the water more quickly than the tissue. Another salient point is that the carbon radiators' quick response time guarantees that there will be no damage to the coated tissue even in the case of a possible band stop.

Running Processes with Temperature Profiles

The scrap rate can be dramatically reduced when optimally predried tissue is used. Manufacturing demonstrates that fitting the equipment with infrared radiators enables the airbag tissue to be heated so efficiently that its installation pays off after only ten tissue coils are coated.

Heat resulting from infrared radiation has already proven its worth when drying coatings, and the significant influence of the infrared radiation's wavelength on the drying procedure is known. Water evaporates especially quickly when exposed to infrared radiators of the medium wavelength. The reason for this phenomenon is that the radiation of the medium wavelength is absorbed in water very well and then immediately converted into heat. At Heraeus, the carbon radiators CIR were designed just for the medium wavelength range.

Infrared radiators react within seconds, so that the heat may be switched on and off quickly. As a result, time-wasting preheating procedures are unnecessary and temperature profiles can also be implemented during the process.

Infrared radiators from fused quartz are frequently superior to conventional methods such as hot air and vapour, because they may be precisely coordinated with the product and the process by means of their wavelength, shape and power.

▶ **www.heraeus.com**

Translated from Kunststoffe 11/2005, pp. 134