optris
infrared thermometers

APPLICATION NOTE

Reliable temperature measurement in medical technology

Medical engineering devices are evolving quickly and accompanying request towards the suppliers of device components are increasing as well.
The Optris GmbH reacts to this by regularly improving and adjusting its sensors for non-contact temperature measurement.

Medical devices are often very small and compact. Therefore, the construction of the temperature sensors is an important requirement for their use. Through constant exchange with customers, Optris has been in the position to optimise the optris CS LT for medical technology.

Picture 1: Infrared thermometer optris CSmed LT with plug for simple fitting and removal

Due to its length of only 87 mm and a diameter of 12 mm, the optris CS LT fits perfectly into smallest medical devices and products. The optris CSmed LT is a special version of the device. It offers a huge advantage to the customer: A short connecting cable with a plug. This plug allows a fast and simple fitting or removal of the thermometer, e.g. for regular calibrations.

Temperature control in the cryo technology

The optris CS LT finds regular use within the medical technology, such as for cryo technology. The cryo technology is also known as the low temperature technology. It is used to generate low temperatures with a temperature range around -150°C.

This technology is used for treatments with cold shock. The cold shock therapy is used for sporting injuries, swellings, inflammation, bruises or muscle stiffness as well as oedema, haematoma or scar tissue. Inflammation spots can be dismantled faster and a reduction of the pain can be achieved.

Picture 2: Temperature control at the skin surface during the cold shock therapy for the treatment of e.g. muscle stiffness

Picture 3: Mouthpiece insert as a finished part example after the thermoforming process

One medical OEM customer of Optris is using gas bottles with liquid CO_2 gas for the thermo shock treatment. The liquid CO_2 gas is pressed out of the gas bottle with 1-2 bars and applied to the skin as dry ice. During this process, the skin of the patient is cooled down from about 32°C skin surface temperature to 2°C - 4°C within 30 seconds. To do not undercool the skin and cause harm to the patient, permanent control is necessary during this process.

For an easy control of the temperature of the skin surface, the optris CS LT is implemented into the pistol of the head unit and the measured surface temperature is shown on a display. Due to the wide temperature range between -40°C and 1030°C, the optris CS LT finds perfect use within the cold shock therapy. Skin damages are avoided due to the exact display of the temperature.

Thermoforming of dental products

An important application of infrared temperature sensors within the medical technology is the implementation of infrared thermometers in thermoforming devices which are used for the production of dental products.
An example would be a customer of Optris who is producing thermoforming units for dental laboratories. These units are producing individual adjusted mouth pieces, which are used as protection during sportive activities.

Ahead of the forming of the mouthpiece (plastic foil), infrared radiators are heating up the piece to a defined temperature and the piece is homogenized thermally. A high homogeneity over the surface and a proper adjustment of the reforming temperature will lead to high quality reforming results.

Picture 4: Infrared thermometer optris CS LT for temperature monitoring during thermoforming

The temperature needs to be monitored to achieve a steady product quality of the material and to avoid local burning and crack formations.

In existing machines, the temperature has been measured through contacting temperature measurement at the radiator. Recently, the company started using the advantages of non-contact temperature measurement. The pyrometer optris CS LT, installed underneath the infrared heater, captures the temperature of the foil during the heating process. The heating stops at a set temperature and the thermoforming process starts.

Besides exact temperature measurements, the optris CS LT offers the advantage that it can be used in surroundings up to 80 °C without additional cooling.

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