

Summary

In the course of this degree project dedicated to the development of the portable pyrometer for measuring the surface temperature of a molten metal, the review of current methods of measuring the temperature of contact and contactless type was conducted, considering their advantages and disadvantages.

To measure temperatures over a wide range from 700 to 3800 K, a pyrometric lamp have been selected, providing two measurement ranges: from 700 to 2360 K, and from 2360 K to 3800 K with additional optical filter installed. A preliminary model of the device's optical system was developed, based on the Kepler's tube, and then optimized using Zemax CAD toolkit.

A set of microchips was selected to implement display of the measurement results on the LCD screen, ability to connect to the computer via USB interface and automatic correction of the measurement results considering a metal surface's emissivity coefficient.

Also, the measurement errors were calculated and a measurement technique has been developed. Assembly drawings of the device and all of its main components were made, all components of the optical system have been detailed and the electric circuit system was developed.