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# OPTICAL SYSTEM FOR CONTROL PLASMA SPRAYING

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**Abstract.** In the present paper experimental results bearing on the dependence of spectral radiation of different powders upon conditions have been rendered. An experimental unit for research of optical characteristics of powder within a plasma jet has been described.

In the thermal spray process, the particle temperature at impact on the substrate surface is an important parameter which influences the quality and characteristics of the deposit formed. In order to ensure the repeatability of desired coating characteristics, and to control the process, it is necessary to measure the temperature of the particles, in flight, before impact on the substrate. Since the particles are small (of the order of 10 to 100 microns in diameter), and moving at high velocity (up to 1000 m/s) and moreover, can have high temperature (as high as 3000 °C), only nonintusive optical techniques are applicable.

These techniques deduce the temperature of an object by measuring the intensity of radiation emitted by the object in one or more spectral (wavelength or color) bands. The technique is however susceptible to errors caused by variations in emissivity with wavelength, and special precautions must be observed to ensure that adequate signal strength is available to obtain an accurate measurement.

An experimental unit for research of optical characteristics of powder within a plasma jet includes standart equipment for plasma spraying (plasma gun, power source, console, powder feeder, etc), and an optical set. The optical set consisted of monochromator and electronic blocks for control and processing of optical data by means of a computer on the base of Intel-80286 type processor.

Combination of light guides and photomultiplyers allowed automatical selection of the desired spectral range from 200 to 850 nm. The equipment allows carrying out a gradual analysis of radiation within the visible range with a step from 1 to 5 nm. It is possible to record 6 different regimes.