

**FEATURES OF THE APPLICATION OF THE IQLAB PROGRAM
FOR SOLVING THE INVERSE PROBLEM OF THERMAL
CONDUCTIVITY FOR NICKEL-CHROMIUM CYLINDRICAL
THERMAL PROBES OF VARIOUS SIZES**

Razumtseva O.V., Protsenko L.N.

Institute of Technical Heat Engineering NAS of Ukraine

Tel. 453-28-93, e-mail: admin@ittf.kiev.ua

The aim of this work was to verify the correctness of the IQLab program operation when the temperature on the surface of cylindrical thermal probes from heat-resistant nickel-chromium alloys of various geometrical sizes with 1 - 3 thermocouples was restored.

Results.

- for TP size $D / N = 10/50$ mm, $12/60$ mm and $25/100$ mm, the surface temperature can be restored with acceptable accuracy according to the readings of one thermocouple located in the geometric center of the TP, which greatly simplifies the manufacture of the thermal probe, preparation and carrying out experiments;

- for TP size $D / N = 50/200$ mm with three thermocouples located in the center of the sample, directly on the surface and at a distance of 5.0 mm from the surface, the program makes it possible to restore the surface temperature by $T_{c.e.}$ and on T_{5mm_e} . with close and acceptable for practical use values of ΔT ;

- the detected tendency to increase in error when the surface temperature recovers when the data collection point is removed from the surface confirms the expediency of placing the control thermocouple as close as possible to the surface, primarily for overall thermal probes and media with a high cooling rate;

- inverse heat conduction problem solution and restoration of surface temperature allows calculating other important characteristics of the sample cooling process: heat flux density and heat transfer coefficient.

Findings.

The program can be used for engineering, laboratory calculations to determine the surface temperature for cylindrical samples with a diameter of 10 ... 50 mm with one thermocouple, and for larger samples $D \geq 50$ mm, it is necessary to install control intermediate thermocouples and conduct pilot tests under production conditions.