

4.2.24. INFORMATION-MEASUREMENT SYSTEM OF NONDESTRUCTIVE CONTROL THERMOPHYSICAL PROPERTIES AND STRUCTURAL CONVERSION IN POLYMER MATERIALS

Mishchenko S.V., Zhukov N.P., Mainikova N.F., Rogov I.V.,
Tambov State Technical University, Tambov, Russia

The main goal of this work is the creation of information-measurement system (IMS) which implements methods of nondestructive control of thermophysical properties (TP) and temperature-time characteristics of structural conversion in polymer materials (PM).

Information-measurement system (Fig.) consists of personal computer (PC), measuring-controlled board PCI-1202H, changeable measuring prods (MP), regulated power supply (RPS). The prod effects thermally the product, its fixed temperature in the specified check points by means of thermoelectric converters (TC). Front connector of the measuring prods is put on the product surface. Thermal action is based on the heater (H) functioning, heater presents itself a disk and measuring prod built into the support. Power supply capability and period of thermal action (TA) are predetermined via interface (I), controller (C1), digital-to-analog converter (DTAC). The temperature allocation on the surface of the product is controlled by means of several thermoelectric converters (TC). The temperature is fixed in the centre of the heater and at the contact point of support and the product. The thermoelectric converters signals go through multiplexer (M), amplifier (A), analog-to-digital converter (ATDC), buffer (B) and interface (I) into PC. Controller C2 provides the order of channels activity and different measuring intervals in each channel. Data collection is made while heating and warming the product.

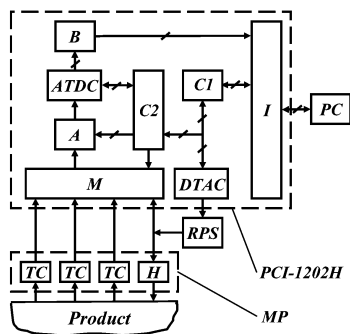


Fig. Information-measurement system

IMS realizes the algorithm of thermophysical properties (TP) determination, control of temperature-time characteristics of structural conversion in polymer materials (PM), experiment process control. Experiment control and data base processing is organized according to the special algorithms.

Software set (SS) includes drivers PC-Card; software package of system interface PCI; operating system Windows; library input-output; programming language Object Pascal; user's programmes which realize nondestructive control methods. SS functions: heater electric tension control; measurement; information collection and processing; real-time information mapping graphically and digitally.