both measurement and nonmeasurement, carried out by the system [12]. This extends the existing concepts of metrological provisions for measuring devices and calls for resolving the problem of ensuring reliability in carrying out information and logical functions. Regardless of the nontraditional nature of the stated problem, it is the most significant among problems relating to metrological provisions for fourth generation IMS.

LITERATURE CITED
7. GOST 16263-70, Metrology, Terms and Definitions.

CHARACTERISTICS OF METROLOGICAL PROVISIONS FOR APPCS

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In resolving questions connected with metrological provisions for automated production process control systems (APPCS), we have to account for a series of characteristics distinguishing them from other systems which carry out measurement functions (information measuring systems, measuring and computing systems, technical diagnostic systems, etc.). In this case, it is not the individual characteristics, but their totality that makes it possible to speak of the APPCS as a specific object for which metrological provisions have to be made and a self-contained system of rules, conditions, requirements, and norms aimed at obtaining the required measurement accuracy has to be developed.

We can identify the following characteristics that are inherent to a larger or smaller extent in APPCS in relation to the nature of production and the production process:

1. Prolonged (months) and continuous (without stoppage) character of operation. This is indicated by the production process regimes and procedures. There are considerable economic losses due to production stoppage. This characteristic does not facilitate random disconnection of APPCS from the object in order to undertake metrological maintenance.

2. The unbroken link between the APPCS and controlled production object (CPO) along with which the former constitutes a unified automated production complex. In many cases, the location and method of installation of the primary sensing units in the production equipment do not provide for access for carrying out metrological maintenance of the corresponding measuring channels (MC) as a whole (including the sensing unit). This makes it necessary to metrologically service the sensing elements and electric circuit separately.

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Here, in most cases, the design of the sensing units is generally not conducive to metrological servicing even with the APPCS stopped.

3. A steady-state operating regime of the automated systems of continuous production process control (most of the CPO) when, for most of the time (more than 90%), values of the measured production process and equipment parameters are close to the rated, while those of the external influence factors are close to some steady-state values characteristic for that process.

It follows from this that, firstly, there is a conditionality in extending the results of any metrological tests carried out with stoppage of the production process to the normal operating regimes of the APPCS due to differences in parameters of the external medium and, secondly, there is a redundancy in the checking of the MC over the entire measuring range set by the technical assignment for the APPCS.

4. In a series of cases, there is a lack of information and time surplus in the APPCS during its operation (in most cases, there is no possibility of disconnecting the sensing units for metrological servicing of corresponding MC without adversely affecting the production process, small time margin for metrological servicing of the MC in the periods between successive interrogations, and lack of machine time of the APPCS for solving problems of control and processing of results of the required metrological experiments since the processor is loaded with the solution of the system's own problems). This means that even if it is possible to connect the required test equipment to the MC inputs, it is impossible to interrogate these channels and process the results of the checking when the APPCS is operating in the production process control regime.

5. The "open" character of the APPCS which does not exclude unauthorized access to the MC and unauthorized changes in the technical and software components (this is a characteristic inherent even in some other systems).

6. The spatially dispersed nature of the APPCS when individual technical devices operate under different (as a rule) environmental conditions. The spatial extent of the lines of communication is a source of additional errors.

7. The system is an object of capital construction (it is not released by the manufacturer) and is not a manufactured product. The procedure for design, assembly, adjustment, tests, and putting the APPCS into operation is determined by special documents (State Standards and State System's documents) in accordance with which the system occurs as a finished product only in the industrial object. Metrological testing of measuring channels of the APPCS can be carried out only at the industrial-experimental and operating stages.

8. Requirements for the APPCS are drawn up in accordance with the Standards ESS ASU as requirements for the functions of the APPCS and requirements provisions for the control system to cover the technical, mathematical, programming, organization, information, legal, and metrological aspects. In accordance with these documents, the design of the APPCS should contain a description of the technical solutions for these types of provisions for the system (and it is not obligatory for the design to contain any other information).

In this context, metrological provisions for specific designs of APPCS can be made by working out concrete technical solutions for each of the above types of provisions and by describing these in the design documents. In accordance GOST 1.25-76, these provisions incorporate a set of requirements, conditions, rules, and norms of a technical, organizational, and legal character.

This sort of approach facilitates the identification of the following groups of requirements for metrological provisions for the APPCS, i.e., requirements for:

- initial data (including requirements for the metrological characteristics of the MC or accuracy in the required measurements);
- structure of the MC and composition and metrological (or accuracy) characteristics of components of technical devices and software of the MC;
- technical devices (including measuring devices) necessary for metrological testing of the MC;
- the subscriber points and data transmission equipment;