METROLOGICAL SERVICE

METROLOGICAL ASSURANCE CONTROL AS A PART OF FACTORY QUALITY MANAGEMENT

A. S. Krivov

ISO 9000 does not require the revision of functional tasks or modes of operation of metrological services for quality management. Documented control procedures for inspection, measuring, and test equipment can be considered a subsystem of total quality management. The satisfaction of legal requirements for the assurance of measurement uniformity is a priority in metrological activity at factories.

In 1998–1999, more than a thousand factories in various branches of industry created quality-assurance systems in accordance with ISO standards [1]: the set and nature of the problems to be solved by all participants in industrial processes and support units are being changed, and organizational and technological problems of planning and production are being solved anew. For metrologists, these changes, which involve the creation of quality-assurance systems, are superimposed on the complicated process of introducing the law “On the assurance of measurement uniformity” [2]. The normative documents that have been developed on the basis of this law determine the list of metrological-assurance tasks and procedures for their implementation at factories that are subject to state metrological inspection. There is no doubt that these two most important areas of metrological reform must be compatible not only with one another but also with the well-recommended forms of departmental metrological activity that most fully take into account the specific nature of production. These rational forms of metrological activity include expert metrological inspection (in production processes and complex products); tests of unique instruments and certification of measurement procedures by specialized industries with allowance for the specific nature of their application; and the creation of metrological-assurance programs that cover the entire production life cycle – from design to utilization. The requirements of state standards, rules, and norms as well as international and departmental standards provide for quality assurance of the final product. We shall examine efficient procedures for control of inspection, measuring, and test equipment foreseen by ISO standards at factories at which the metrological services have many years of experience and tradition and have introduced the main parts of the normative documents on measurement uniformity that are in effect in the country.

The development ideas in the area of quality assurance as applied to a market economy has led to the creation of a new philosophy: universal quality management. This has become the basis for the organization of production in most developed countries; and recently, for many domestic factories. For factory managers, in addition to metrological questions, it is convenient to consider new models of quality as a stage of development of quality-assurance systems created earlier. Creative attempts to understand and thorough working out of quality problems under conditions of administrative control of the economy made it possible to create in the 1980s at many factories comprehensive systems for control of production quality that provide a base for the introduction of models in accordance with ISO standards. The following positions of the new philosophy of quality are of fundamental importance [3]: constant improvement of production quality; increased attention to consumer requirements; modernization of all forms of activity (processes); participation and specific responsibility of upper management; and a scientific approach.

The universal nature of quality management has transformed the role and tasks of metrology in quality assurance. As is known, measurements are the main source of objective information and a component part of any production process, performing both assurance and control functions. In international standards, unlike in domestic standards, single requirements have been formulated for measurement, inspection, and test methods and instruments, i.e., independently of the scale on which the...
procedure and device are based: one of the metric scales, scales of designation or order. It must be noted that such procedural uniformity of data operations is advisable in applied "industrial" metrology, all the more in that most inspection and test methods contain operations of comparison with a unit. In systems analysis of measurement, inspection and test methods and instruments used and research, it should be borne in mind that these topics have been studied for many years by domestic metrologists [4]. Thus, in the ISO standards, metrology is the main link in quality assurance, connecting the procedural and technical components of measurement, inspection, and testing (see Fig. 1).

To understand all of the features of modern quality-assurance models, the appropriate literature and standards must be studied. Here we shall consider particular features that affect the organization and methodology of operations in metrological assurance, i.e., those that have a specific applications character. Figure 2 shows those features and their consequences for metrological activity. We shall consider as an example the need to reform the structure of the enterprise when quality-system models