METROLOGICAL PROVISION IN A QUALITY CONTROL SYSTEM

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The complex quality control system developed in the enterprise, the SOVKUPRON (system for ensuring high quality, increasing lifetime, and raising reliability) complex product quality control system (CPQ CS), envisages eight principal areas of activity in the product development, production, and operation stages to provide for the fulfillment of the basic functions of control — norm setting, planning, monitoring, recording, and controlling. One of these principal areas is the metrological provision for quality control.

The SOVKUPRON CPQ CS envisages that work should be carried out at five hierarchical levels, the first being the level of the enterprise directors, the second that of principal service directors, the third that of workshop, section, and complex laboratory directors, the fourth that of section directors, and the fifth that of the actual operatives.

At all stages in the system the quality evaluation is made for the workforce as a whole and for each worker individually.

Figure 1 shows a diagram of the activity of the metrological service. The chief metrologist, who reports directly to the chief engineer of the enterprise, is responsible for carrying out metrological provision work and directs this activity. The work is carried out in accordance with the enterprise standards (EPS) drawn up from standardization plans confirmed by the management of the enterprise.

Enterprise standards are drawn up for the activity of each branch of the metrological service individually for each level. For example, the work of the first level is governed by enterprise standard 125EPS.622-30–76, at the second level the work is carried out in accordance with EPS 51EPS-622-20–76, and the activity of the third level is provided for in enterprise standards 51EPS-622-21–76, 51EPS-622-35–76, and 51EPS-622-36–76, etc. (the titles of the EPS correspond to the designations of work shown in Fig. 1).

The quality of work carried out at each level of the system is characterized by criteria with differing significances. For example, the quality of the work done by the metrological service and the production-technical subdivisions of the enterprise on metrological provision is evaluated taking into account the following criteria: wastage due to infringements of metrological discipline; delays in the filling out of the scrapping form; delays in operational measurements in accordance with the requirements of the customer, the technical control department (TCD), and production; delays in distributing the documents concerning the results of operational measurements; the failure to meet deadlines for completing directives and normative-technical documents; the failure to meet planned indices for evaluating the quality of labor; the existence of unsolved metrological provision problems leading to delays in production by the TCD or representatives of the customer; the infringement of inspection schedules; the infringement of the metrological certification schedules for measurement facilities for which norms do not apply; the infringement of measurement facility metrological certification schedules; the infringement of schedules for carrying out metrological expert examinations and metrological reviews; the failure to fulfill the metrological requirements.


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Fig. 1

according to review, expert examination, and certification forms and inspection schedules; the incorrect assignment of measurement, control, and testing facilities and methods; and the operation of measurement and testing facilities which are not suitable for use.

The index of the quality of the work done by the metrological service is calculated by the formula:

$$P_{M}(K) = 1 - \sum_{i=1}^{n} d_{i} f_{i}(K).$$

where $n$ is the number of criteria characterizing the quality of the work; $d_{i}$ is the coefficient of significance of the $i$ criterion, and $f_{i}(K)$ is the local index of the quality of work according to the $i$ criterion (number of infringements of metrological discipline according to a specific criterion).