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FIBEROPTIC TESTING OF WATER OPACITY

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A large variety of different by their physico-chemical nature heterogeneousness of water causes the corresponding variety of quality indicators. In Russia, the current state of water is determined by 80 indicators, after which, in accordance with the requirements SanPiN 2.1.4.1074 - 01 «Drinking Water. Quality assurance » the quality control is carried out by specialized laboratories. For production quality control of water special programs are available.

In general, the existence of physical and technical irregularities in the water is reflected in the integrated quantity of it - in turbidity. However, turbidity is a characteristic of the relative transparency of water that determines its consumer properties. Turbid water and tainted water, water clean and crystal water serve as the essential characteristics of water for consumer. Drinking water and pharmaceutical, waste water differ as by standards and technologies, and sources of pollution and sources of primary information. It is the consisting of heterogeneous inhomogeneities in clean water, as a homogeneous medium with linearly indicators, a source of primary information on water quality.

The report reviewed the basic principles of technique and technology of fiber-optic control of turbidity.

A common case of light passing is a light passing environment with a variety of inhomogeneities, informative radiation is simulated with dependence

$$\Phi_u = \Phi_0 \left[1 - \exp\left(-\frac{3}{4}\sum_{i=1}^{m}\frac{C_i}{r_i}\,\sigma_{(\lambda,r_i)}\right)\right]$$

where m - the index of different types of inhomogeneities;
C i - volume concentration of inhomogeneities of i-size;
ri - a radius of inhomogeneities of i-size;
$\sigma_{(\lambda,r)}$ - Scattering coefficient of the radiation λ Inhomogeneities radius ri.

In turbidity meters, built on turbidity metric methods, the key role in the formation of informative radiation plays the light flux, passed through the large heterogeneity. By contrast, in turbidity-nefelo meters basic information about the presence of small inhomogeneities is formed by scattered radiation.

Difficulties in establishing uniform turbidity meters on the integrated use of physical and technical advantages of nefelometrics and turbidimetrics result in the development of specialized tools and technologies, applied to specific circumstances and objectives of the technological control of individual heterogeneous environments for enterprises, businesses and industries.

Optical-electronic turbidity meters with optical channeling, distribution and orientation of elementary visual flows provide the opportunity to comprehensively take into account the informative parameters of a heterogeneous environment and stimulating radiation with high noise immunity and oriented for transfer of information radiation. Spatial-isolated distribution of an elementary fluxes of light on a variety of optical monofilaments as light conducting environment, creates the conditions for a variety of combinations of circuit, which is especially important in operational control.

The report dealt with single-and two-channel circuits of fiber optic turbidity meters.

In light conducting turbidity metrics there is effectively implemented the combined control of transparency and concentration of heterogeneities on the physical fundamentals of nefelometrics and turbidimetrics. Channelity of fiber-optic circuits is determined by a combination of light conducting fibers, grouped in a flexible or rigid bands with space division (and orientation) both at a source of radiation, and at the receiving side. At the same time, each band represents on one hand channeled multielemented emitter and, on the other - a spatially separated multielemented light collector. In accordance with the algorithm such light conducting bands, are built into a single parametric range of the information-optical transition. Here, combining the arrangement of optical fibers in the lighting and data light conductors, you can split the radiation of source and construct spectral-energy sources (lamps) and selectively targeted for the spectral range light collectors (photo collectors). This feature of the optical transformations of primary information allows you to effectively apply the method of spectral energy comparison and selection.