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ELECTROMAGNETIC COMPATIBILITY ASSESSMENT BY FLICKER DOSE MEASUREMENT

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Electromagnetic compatibility refers to the possibility of normal operation of power consuming units in electric power systems without compromising the quality of electrical energy.

Power consuming units with abruptly variable loads (electric arc furnaces, electric welding equipment, rolling mills, etc.) cause voltage fluctuations in electric power systems and, as a result, light sources flickering, which has a negative impact on the physical and psychological health of people and on their work performance. Permissible voltage fluctuations on lighting devices terminals are specified in the standard GOST 13109–87. *Electrical energy. Demand for quality of electrical energy in general purpose electrical networks* by flicker dose. Flicker dose refers to a measure of the sensation of unstable visual perception caused by a light source, whose brightness changes over time and is measured by a special device called flickermeter.

The core of the flickermeter is a weighting filter, which is essentially a model of voltage fluctuation perception by a light source-visual analyser system. Structure and parameters of the weighting filter as well as the curve of permissible values are based on experimental studies of the impact on humans of periodic voltage fluctuations on terminals of 220-volt 60-watt incandescent lamps.

With the emergence of new energy-efficient light sources, such as LEDs and energy-saving light sources, the reliability of flicker dose assessment tools and methods specified in the existing standards has been compromised. In addition, test and calibration signals, which are used to verify the flickermeter performance, provide results that differ significantly from the curve of permissible values. These problems are caused by the «empirical approach» to the justification of the flickermeter structure imposed by IEC TK77 and by the fact that a sufficiently accurate methodology for calculating the flicker dose for any light source is not available.

Therefore, a unified software and hardware system for assessing electromagnetic compatibility by flicker dose that is devoid of the above disadvantages must be developed.