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NON-SINUSOIDAL LOADINGS AND THEIR EFFECTS ON OPERATION OF DISTRIBUTIVE OIL-FILLED TRANSFORMERS

ABSTRACT

The increased use of electronic loads such as computers and switch mode adjustable-speed-drive motors in light industrial, commercial and residential loads has created a need to apply the harmonic loading practices to liquid filled distribution transformers. The operation of transformers with severely nonlinear loads, results in non-sinusoidal voltage and current waveforms, a phenomena that until recently was relatively uncommon and affected only a few customers. The main problem concerns excessive heating of the windings due to eddy currents induced by the harmonic frequency components of the leakage flux. This paper discusses these problems in terms of characterizing parameters and also presents a simple uniform method of describing a load to an existing transformer which was not originally specified for supplying non-sinusoidal load currents.

Keywords: harmonic, nonlinear loads, eddy currents, heating, non-sinusoidal.