A COMPREHENSIVE APPROACH TO DEFECT TYPE RECOGNITION BASED ON THE RESULTS OF DISSOLVED GAS ANALYSIS

Shutenko O. V., Kulyk O. S.
National Technical University
"Kharkiv Polytechnic Institute",
Kharkiv

It is fundamentally impossible to ensure the reliable operation of electrical network equipment beyond its standard service life without the use of modern diagnostic methods. One such method is the Dissolved Gas Analysis (DGA), which can detect up to 80% of defects. An indisputable advantage of this method is the possibility not only to detect developing defects at an early stage of their development, before deep destruction of insulation has occurred, but also to recognize their type (electric discharges, local overheating or combined defects).

Three criteria are currently used to recognise the type of defect. The first and most common is characteristic gas ratios. Most international and national standards use three ratios: CH_4/H_2, C_2H_4/C_2H_6 and C_2H_2/C_2H_4. In addition to these ratios, some authors' techniques (Dörnenburg, Rogers, Müller) suggest the use of ratios such as C_2H_6/CH_4, C_2H_2/CH_4, C_2H_2/C_2H_6 and C_2H_4/C_3H_6. The percentage content of gases is used in the Key Gas method, Duval Triangles and Pentagons and in the GATRON Triangle. The ratios of gases to the maximum concentration gas are used in the nomogram method. The results of studies given in [1-2] clearly show that the use of only one criterion (for example, characteristic gas ratios) to recognise the defect type from DGA results does not always allow to make a correct diagnosis. The most accurate diagnostic conclusion can be obtained based on a comprehensive analysis of both gas ratios and gas percentages and defect nomograms. The implementation of a comprehensive approach to the recognition of defects of various types [3-4] can significantly increase the reliability of the diagnoses made.

References:

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