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REGISTRATION NUMBER : 5279
GROUP REF. : A2
PREF. SUBJECT : PS3
QUESTION N° : 3.6

Metal oxide varistors are generally used on transformer regulating windings to limit the potential difference across the winding during transients. This is applied on regulating windings of auto transformers and when the regulating is located at the line end. The determination of the number of elements across the winding or steps is part of design calculation. These are installed during factory production and positioned in the tank, immersed in oil, and are often installed on the vertical axis. They are therefore, like the other components inside the tank, not accessible during service life. It is however important to know their condition.

There is no vast information currently available on the exact strategies of assessing the condition of varistors in service. To the best knowledge of the author, these are also not a major contributor to transformer failures, and the most likely defects encountered are originating from the poor workmanship during production and not from the varistors themselves. There is a known case for a 40MVA transformer that had a Buchholz alarm on the day it was energized. After a lengthy investigation, it was established that one of the lead connections on the ZnO assembly was not properly done and the crimped connection was sitting loose. Yet, on further investigation this was found not responsible for the gassing and arcing marks were found somewhere else. It is possible that this defect too was going to cause gassing.

The assumption by the author at this stage is that any deficiencies in the ZnOs assembly and connection will be detected through DGA, yet it will not be easy to conclude beyond a doubt without doing physical inspections that will require even the draining of the oil.