

IEEE Standards Interpretation for IEEE Std C57.12.91™-2001 IEEE Standard Test Code for Dry-Type Distribution and Power Transformers

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Interpretation Request #1

Clause: 10.3, 10.3.1

Subclause 10.3 - Applied-voltage tests and subclause 10.3.3 - Ground connections during the test states, "A normal power frequency such as 60 Hz shall be used and the duration of the test shall be 1 min."

If the test lab only has 50 Hz available for testing, is that acceptable? There are different opinions that weigh in on both sides of the issue. Some say that if you use 50 Hz than you have to adjust the test duration to 72 seconds to account for an equivalent number of peak voltages seen during the length of the test. Other say that as long as the frequency is between 45-65 Hz than a test duration of 60 seconds is fine ... one reason being that the at less than 60 Hz the wave form is wider so that at these lower frequencies the cable is subjected to a voltage the levels between 97% and 100% for a longer period of time per cycle. In any event, what is the Working Group official response or ruling?

Interpretation Response

This question out to several members within the Dielectric Test Subcommittee, both to manufacturing and utility representatives, and received five responses. All but one commented that the test duration should be for one minute regardless of whether the applied frequency was 50 or 60 Hz. Perhaps the most useful response of these was actually an admonishment that we don't really need an interpretation here since standards are already clear on this subject. Specifically, the initial sentence of subclause 10.3.3 of C57.12.91 states: "A normal power frequency such as 60 Hz shall be used and the duration of the test shall be 1 min." The italicized words are key here. C57.12.91 also references IEEE 4 in Clause 2. Article 6.1.1, Requirements for the test voltage, within

Clause 6, Tests with alternating voltage, within IEEE 4 states: "The test voltage shall be an alternating voltage having a frequency in the range of 45-65 Hz, normally referred to as power frequency voltage." Hence, the standards are indeed quite clear; the test duration shall be 1 min regardless of whether the applied frequency is 60 or 50 Hz. Another response indicated that IEC standards specifies that the 1 min duration applies to test frequencies not less than 80 % of the rated frequency. Hence, IEEE is in line with other standards within the industry.