IEEE Standards Interpretations for IEEE Std C57.19.100™-1995 IEEE Guide for Application of Power Apparatus Bushings

December 2009

Interpretation Request #1

Topic: Temperature Limitations for Bushings **Subclause:** 4.1.1, 4.1.3 (e)

IEEE Std C57.19.100-1995, 4.1.1, indicates that temperature limitations for bushings are based on average 24-hour insulating oil temperatures (for transformers). It is also noted that 4.1.3 (e) indicates that the temperature of external connections do not greatly impact bushing hot-spot temperatures unless loading beyond nameplate rating. The loading of our typical transmission facility varies with the daily load cycle and is not continuous over a 24-hour period; therefore the average loading over a 24-hour period will be substantially less than the rated value.

Based on these observations, clarification of the standards regarding the temperature of external conductors connected to bushings is requested. Specifically, is it acceptable that the average conductor temperature, e.g., over a 24-hour period, remain below 70°C (for transformers) or 85°C (for circuit breakers), or should conductors connected to bushings never exceed these temperatures?

Interpretation Response

Input was requested from an IEEE Std C57.19.100-1995 group and four responses were received which indicated that the answer is actually in the bushing standard – IEEE Std C57.19.00-2004. This states that the maximum temperature rise at the top terminal is 30 K, with the maximum ambient of 40 C with a 24 hour average of 30 C. From this, the answer should be for the temperature to not exceed 70 C without possible loss of life.