Quiz #68 TECH Quiz ?

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Field Testing of Motors

1. According to IEEE Standard 43, what are the recommended minimum insulation-resistance values for the motors listed below?
   a. Windings made before 1970 _____
   b. Form-wound coils made after 1970 _____
   c. Random-wound stator coils and form-wound coils below 1 kV _____

2. The base temperature used in temperature correction for motor insulation resistance is:
   a. 10^0 C c. 40^0 C
   b. 20^0 C d. 60^0 C

3. At what insulation-resistance value does the polarization index (PI) become invalid?
   a. 500 MΩ c. 5 GΩ
   b. 1 GΩ d. 10 GΩ

4. What is the recommended minimum PI for a machine with Class A insulation?
   a. 1.0 c. 2.0
   b. 1.5 d. 2.5

5. According to IEEE 43, when the PI value exceeds some level it may indicate that insulation is brittle. What is that value?
   a. 7 c. 10
   b. 8 d. 16

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Answers

1. IEEE Standard 43 provides the answer. Windings made before 1970 should have a minimum IR of 1 MΩ/kV + 1 MΩ. Form-wound coils made after 1970 should have a minimum IR of 100 MΩ. Random-wound stator coils and form-wound coils rated below 1 kV should have a minimum IR of 5 MΩ.

2. The temperature correction factors for motor windings are different than for other types of insulation as they use a 40^0 C base temperature.

3. This question had been in a previous Tech Quiz, but I wanted to see if you were awake. IEEE Standard 43 recommends that when the insulation resistance is above 5 GΩ that the PI is not valid. This is because the leakage current is in the microampere range and too many factors can influence the measurement.

4. Class A insulation is the odd-ball of the group. All other insulation classes have a recommended PI of 2.0, but Class A has a recommended PI of 1.5.

5. According to IEEE Standard 43, PI's above 8 may indicate that insulation that is dried out and brittle to the point that it could fail mechanically as well as electrically.