



A Leader in Electric Motor Testing

Tip Of The Week

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Considerations for Re-Testing Insulation

The majority of tests offered by PdMA technology can be tested repeatedly with little concern as to the effect of one test on the next. Insulation resistance-to-ground testing is not one of them. When applying a DC potential across the insulation for a Resistance-to-Ground (RTG), Polarization Index (PI), or a Step Voltage test, the insulation experiences a geometric capacitive current, absorption current, and a conduction current. The conduction current passes through the bulk insulation from the high voltage connector to the grounded surface of the motor and does not create a charge. However, the capacitive and absorption currents create a charge that is temporarily stored across the insulation and must be understood. The capacitive charge occurs very quickly and also decays exponentially with time. The absorption charge results from molecular polarizing and electron drift and decays at a decreasing rate over time. In simple terms, the absorption charge does not go away easily and if not completely decayed will effect a follow-up measurement of RTG.

The industry recommendation for the time necessary for a charged insulation to reach a discharged state is four times the charge time. If you perform a ten minute PI you will need to wait forty minutes before the insulation returns to a fully discharged state if you want to test the insulation again. Another example is a sixty second charge, performed during a MCE[®] Standard Test would require a four minute discharge before starting a PI test if you wanted the PI value to be meaningful for trend purposes. For MCE users wanting to perform Standard, PI and Step Voltage tests remember that the Step Voltage test is designed to perform and save a complete PI and step voltage test. So, run a MCE Standard test with a sixty second RTG, wait four minutes, then run a full Step Voltage test and you will have all the data with minimal to no delay between tests.

If your goal is to drive the stored energy down to a safe level so you can remove your test equipment and move on to test a different asset, then manually discharging the insulation system using a discharge or grounding probe will work. However, as soon as you remove the grounding probe the absorption charge will return rapidly. Low voltage testing for resistance, inductance, or capacitance should not be performed if an absorption charge exists on the insulation system being tested.

To see a variety of case studies involving insulation testing visit the PdMA YouTube Channel at:
<https://www.youtube.com/channel/UC-cUONWaudkKReNwC0PPXMQ>

You are invited to submit an Electric Motor Testing Tip of your own and receive a free PdMA[®] mug or hat if we publish it! Contact Lou at 813-621-6463 ext. 166 or lou@pdma.com.

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