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DIELECTRIC WITHSTAND TEST OF MODULAR AND MANUFACTURED HOMES

The intent of this article is to give answers to questions (among other aspects) related to CIT (Crown Insulation Tester) AC testing, like:

-Which is the appropriate test voltage?

-What area of the circuit should we test?

-How can we test the whole manufactured home with all appliances still connected without damaging them?

In June 2000 the Manufactured Housing and Standards Division of the U.S. Department of Housing and Urban Development issued a letter directed to all Primary Inspection Agencies and all State Administrative Agencies about dielectric strength tests for modular and manufactured homes as specified in standard #24 CRF 3280.810(a), as follows:

"The wiring of each manufactured home is to be subjected to a dielectric strength test between live parts and the manufactured home ground and between neutral and manufactured home ground. The test is either to be performed between 900 to 1079 volts for one minute or between 1080 to 1250 volts for one second. The test is conducted on each manufactured home to stress the insulation to determine if it is capable of resisting transient power line surges to which the wiring may become subjected, identify any low resistance areas of the insulating material and any dielectric breakdown paths of failures that may exist.T"

The test should not be performed from phase to phase, or between hot and neutral conductors, as this may ruin the appliances that are still connected. No particular word is given as to whether AC voltage or DC voltage should be used to perform the test. However, AC voltage ranges have always been acknowledged in the standards.

Method

Potential damage to appliances is of vital concern within the manufactured home during the CIT test. Be aware that those appliances within the home have already been tested to meet all product safety characteristics. When correctly conducted, the test stresses the insulation of the electric conductors and the appliance's dead metal or ground. This can be attained by placing the appliance's power switch in the ON position, while the CIT's return connects to the appliance's dead metal. We would then apply high voltage simultaneously to the hot and neutral conductors. This way the test would provide the same voltage to both sides of all components in the circuit. This technique should be observed when testing the whole manufactured home. We must apply high voltage to both phases (all ungrounded conductors) and to neutral, which must be isolated from ground, and the return should be connected to ground. All switches and C/B's must be in the ON position (Figure 1). When connecting the CIT to the manufactured home this way, testing the whole home with all appliances still connected is feasible and practicable.

Safety Information

In the 60's, both UL and ANSI performed tests to determine the human body's response to different levels of electric current using a 120 volt/60Hz source. It was then found that perception level is 0.5mA, which usually causes a surprise reaction. Between 5 and 10 mA, there occurs paralysis of arms and legs, including inability to release from the source. From 20 to 40 mA, painful muscle contraction appears with further respiratory difficulties, which could lead to choking. From 40 to 70 mA for a second or more, ventricular fibrillation is observed. While currents greater than 70 mA produced severe burns and potential heart arrest.



We welcome any suggestions and/or questions regarding these recommended safety guidelines.

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