

IEC 61010 Electrical measurement category ratings for test tools

Important note: CAT ratings on test tools are different than hazard/risk category ratings on PPE gear. CAT ratings are determined by the potential transient impulse in the workplace that a connected test tool might experience. PPE requirements are determined by the surface energy level a user might experience.

Measurement category	In brief	Examples
CAT IV	Three-phase at utility connection, any outdoor conductors	<ul style="list-style-type: none"> Refers to the "origin of installation"; i.e., where low-voltage connection is made to utility power. Electricity meters, primary overcurrent protection equipment. Outside and service entrance, service drop from pole to building, run between meter and panel. Overhead line to detached building, underground line to well pump.
CAT III	Three-phase distribution, including single-phase commercial lighting	<ul style="list-style-type: none"> Equipment in fixed installations, such as switchgear and polyphase motors. Bus and feeder in industrial plants. Feeders and short branch circuits, distribution panel devices. Lighting systems in larger buildings. Appliance outlets with short connections to service entrance.
CAT II	Single-phase receptacle connected loads	<ul style="list-style-type: none"> Appliance, portable tools, and other household and similar loads. Outlet and long branch circuits. <ul style="list-style-type: none"> Outlets at more than 10 meters (30 feet) from CAT III source. Outlets at more than 20 meters (60 feet) from CAT IV source.
CAT I	Electronic	<ul style="list-style-type: none"> Protected electronic equipment. Equipment connected to (source) circuits in which measures are taken to limit transient overvoltages to an appropriately low level. Any high-voltage, low-energy source derived from a high-winding resistance transformer, such as the high-voltage section of a copier.

Table 1. Measurement categories. IEC 61010 applies to *low-voltage* (< 1000 V) test equipment.

PPE Recommendations based on NFPA 70E for live electrical measurements

<p>Hazard/Risk Category 1: < 240 V electrical environments (110 V/120 V/208 V/220 V panels, 0 to 50 hsp motors and drives)</p> <p>Minimum arc rating for FR clothing: 16.74 J/cm(2) or 4 cal/cm(2)</p>	<ul style="list-style-type: none"> Flame-resistant (FR) long-sleeved shirt and/or jacket with sleeves rolled down and front fully buttoned up (FR clothing must fully cover all skin and ignitable clothing) Natural fiber work pants, 12 oz denim pants, or FR pants Rubber insulating gloves with leather protectors worn over top Safety glasses Hard hat Leather work boots No jewelry, keys, or watch Insulated hand tools
<p>Hazard/Risk Category 2*: 240 V to 600 V electrical environments (270/480/600 V electrical panels, MCCs, switchgear, transformers, bus bars, UPS, and lighting; 100+ hsp motors and drives)</p> <p>Minimum arc rating for FR clothing: 33.47 J/cm(2) or 8 cal/cm(2)</p>	<ul style="list-style-type: none"> FR long sleeved shirt and/or jacket with sleeves rolled down and front fully buttoned up FR work pants (not denims) or coveralls over natural fiber Rubber insulating gloves with leather protectors worn over top Leather work boots Switching hood with hearing protection No jewelry, keys, or watch Insulated hand tools
<p>Hazard/Risk Category 3: High voltage environments (1600 A or higher) (Substations, utility transformers, big facility service entrances)</p> <p>Minimum arc rating for FR clothing: 104.6 J/cm(2) or 25 cal/cm(2)</p>	<ul style="list-style-type: none"> Full flash suit (jacket, overalls, and hood) Rubber insulating gloves with leather protectors worn over top Leather work boots No jewelry, keys, or watch Insulated hand tools

Table 2. PPE categories for live electrical measurement. For complete details, review NFPA 70E "Standard for Electrical Safety in the Workplace", 2004 Edition.

Note: If testing occurs in the proximity (within 4 feet) of an energized environment, then the PPE standards for the energized environment apply.

Note: Category 2* is a higher energy environment than Category 2. These guidelines only list PPE for Category 2*. For the specific distinction between 2 and 2*, reference NFPA 70E "Standard for Electrical Safety in the Workplace", 2004 Edition, Tables 130.7 (c)(9)(a), (c)(10), (c)(11).