



CATEGORY RATINGS

FREQUENTLY ASKED QUESTIONS

What is a category rating and why is it important?

Category Ratings define an environment in which a meter may be used to make a particular test.

These may range from inside a building at an outlet and even inside a piece of energised equipment like a copier, to an open panel inside a structure, or electrical equipment located outside at the service entrance and beyond towards the utility.

Dovetailed to this, is the voltage that may be encountered in that environment.

Voltage vs environments

It is common to find meter rating for CAT III 600 or even 1000 volts, and a very similar meter having a CAT IV 600 volts. If you look closely, you will typically notice a difference in size.

With a larger meter, you can design the layout of the components with more space between them which of course means more resistance against arcing from trace to trace or component to component and thus withstand higher voltages without failure to comply with the category rating test criteria.

As impulse energy travels down the power lines toward your structure, it encounters more and more resistance, impedance to the purists since this is alternating not direct current, and that increase in resistance, or attenuation, dampens the magnitude of the impulse down from higher to lower peak spike magnitudes.

More copper conductors in the form of wire, cable, electrical equipment and connections all add more and more resistance requiring lower category ratings the further into a structure that it proceeds.

This results in a changing requirement for the Category rating. Naturally, a CAT III or CAT IV can be used in a CAT II environment, but the reverse is not true.

You cannot safely use a CAT II meter in a CAT IV environment even if it has a voltage rating that can measure the expected voltage level.

Sources of these spikes can be lightning strikes, but many loads commonly found in factories, businesses and homes can also deliver unexpected surprises.

Motors which are starting or stopping, capacitors, fluorescent ballasts, switching of electrical gear on or off, are just a few examples of situations that can easily create spikes of several thousands of volts.

Category and Voltage Rating Combinations

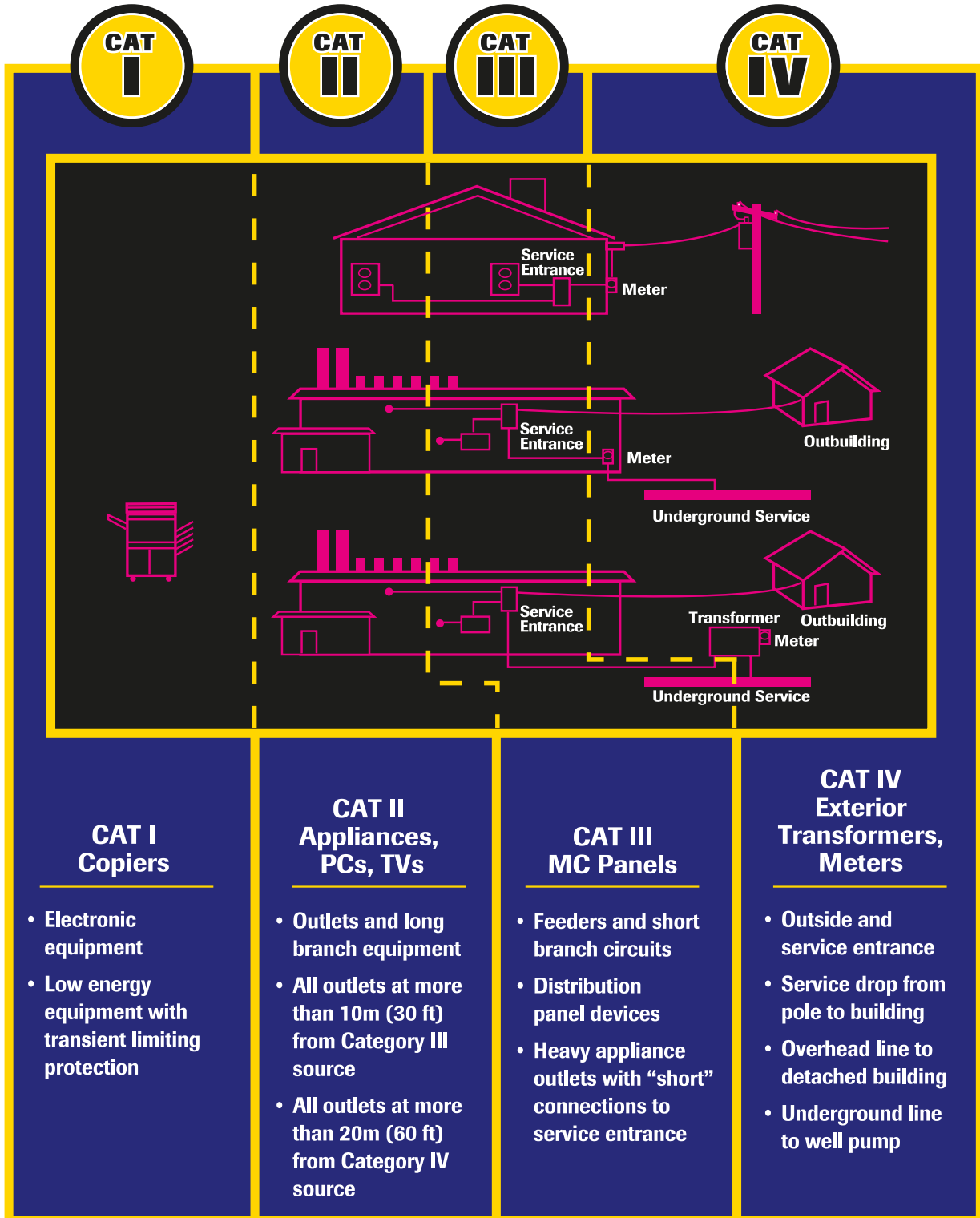
To obtain a Category and voltage rating combination, a meter is subjected to repeated impulses of 6000, 8000, 10,000 and even 12,000 volts to ensure that it can withstand electrical impulse abuse and not create a safety hazard to the user.

It is not uncommon that a number of meters will be destroyed during this certification process. Some because the original design was not perfect, and in other cases meters are tested above and beyond design goals until they fail.

Design modifications are a part of the development of meters to ensure that they meet and exceed the manufacturers specifications. Ultimately this leads to verification that the meter not only meets the Category rating requirements but also results, with separate extensive testing a UL Listing.

Another very important point consider is this. Just like the well-known proverb, 'A chain is only as strong as its weakest link', so goes Category Ratings.

A meter may have a CAT IV 600 Volt rating, and have CAT IV 600 Volt leads attached, but remove just one of the protective caps off the end of a voltage probe, and now the measurement rating and therefore the environment in which you can use the meter is now Category II.





SAFETY IN THE FIELD

IEC (International Electrotechnical Commission) Category Ratings



Category I – The signal level for telecommunications, electronic and other low-energy equipment with transient limiting protection. Peak impulse transient range is 600-4,000 volts with 30 ohm source.



Category II – The local level for fixed and non-fixed powered devices including appliances, lighting and portable equipment. Outlets located more than 30 feet from CAT III sources and 60 feet from CAT IV sources. Peak impulse transient range is from 600-6,000 volts with a 12 ohm source.



Category III – The distribution level for fixed primary feeders or branch circuits. Circuits that are separated from CAT IV sources by at least one level of transformer isolation. Peak impulse transient range is 600-8,000 volts with a 2 ohm source.



Category IV – The primary supply level for the highest levels of transient over voltage. Includes the utility service both outside and at the service entrance, service drop from the pole to the building, overhead line to remote buildings, and underground line to a well pump. Peak impulse transient range is 600-12,000 volts with less than a 1 ohm source.

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