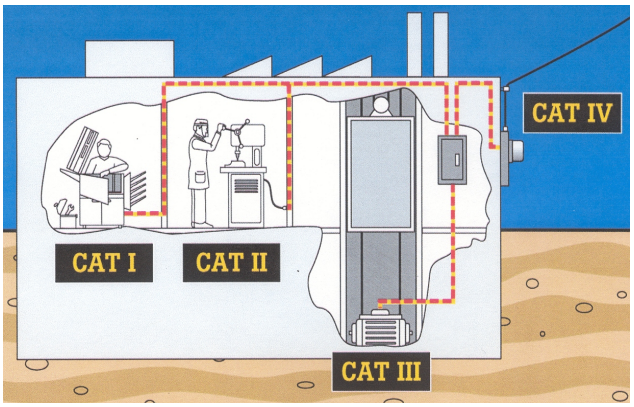
Requirement for meters used at BNL

A voltage impulse can occur at any time on a power system, caused by lightning or by load switching transients. Exposure to hazardous energy depends on the power that might be delivered into the instrument if a fault should occur. The level and energy of a voltage impulse is directly related to circuit location: the closer you are to the power source the higher the available fault current and the higher the *Category*.

ANSI/ISA-S82, the U.S. standard providing general requirements for *Electric and Electronic Test, Measuring, Controlling, and Related Equipment*, is based on International Electrotechnical Commission (IEC) 61010. Safety requirements in these standards cover equipment (and computing devices) for measurement and test, control, laboratory use, and accessories used with them. IEC 61010 defines four *Categories* of risk, based on conventional power system distribution from the utility connection to a user device plugged into a receptacle. The higher the available short circuit fault current, the higher the *Category*.



Category IV	"Origin of Installation," or the connection to utility power, where the greatest danger exists because a transient could trigger an arc blast
Category III	Distribution wiring, including service entrance, feeders, branch circuits and permanently-installed loads
Category II	Receptacle outlet circuits; plug-in loads
Category I	Protected electronic circuits

Illustration by Fluke.

Electrical Test Equipment, especially instruments required for "zero energy" checks, should be stamped for 600V Cat IV and 1000V Cat III.

CAT III - 600V meters have been available only in the past few years. Older meters, when tested, almost never qualify in this Category. They are probably acceptable as CAT II meters.

Removable test leads on modern meters are constructed to shield the banana plug, so the metal portion will not be exposed if the test lead is pulled from the instrument while the probe end is in contact with energized parts.

Solenoid meters, like the "Wiggins" or "Wiggy," are not acceptable for use at BNL.