



Sizing an AC Dielectric Test Set

What Current Rating is Needed? 10 mAac, 100 mAac, 1000 mAac?

AC High-Voltage Testing requires higher current and power ratings than when DC testing the same load. There are several parameters that must be considered when selecting an AC test set, the most important one being the **capacitance of the load**, which dictates the power required from the test set. Following are several considerations to make when specifying a rating:

Voltage Output: Select a test set with **20 – 25% more voltage** than presently needed for possible future increases in testing standards or changes in application. However, **an AC test set is a constant current device** with the maximum output current based the **kVA rating at full voltage**. Increasing the output voltage specification decreases the output current proportionately.

Power/Current Rating: When AC testing, **most loads appear capacitive**. To apply high voltage AC at 50/60 Hz to capacitive loads requires higher power and current ratings from the test set than most portable AC hipots can supply. A test set rated from 1 kVA to 40 kVA may be needed depending on the load tested. **The capacitance of the load must be known to calculate the required current at the required voltage**. Don't undersize the set: select a test set with **25% extra power**.

Another way to determine the current needed at the required test voltage is to apply a lower voltage to the load and measure the current. The current required at the higher test voltage should be linear. For example: **if your load draws 10 mA @ 5 kVac it will draw approximately 100 mA @ 50 kVac**.

To calculate the AC current needed, use the equation: $Amps = 2\pi fCV$
f = frequency in Hz. C = load capacitance in farads V = test voltage in volts

Duty Cycle: Most AC hipot tests are for 60 seconds and most hipots are duty rated for 50%. For example: HVI specs 60 minutes on, then 60 minutes off. The continuous duty rating might be 80% of full rating. If production testing requires many consecutive tests, a longer duty cycle or higher kVA rating may be needed.

Partial Discharge Requirements: AC hipots are needed as the voltage source for performing Partial Discharge and Tan Delta/Power Factor testing. **Many HVI AC test sets are rated for < 10pc of partial discharge at full voltage**, but not all. Generally, steel tank models with bushing outputs are < 10pc while models with fiberglass HV sections and/or a cable output are not. **PD ratings < 5pc are also available**.

Summary: When AC Withstand, Power Factor/Tan Delta, or Partial Discharge testing MV/HV apparatus, aerial lifts, motors/generators, and cable, **the AC charging current can be high** depending on the capacitance of the load. The test voltage is determined by the Test Standard one is following. The current is the unknown. When selecting an AC high-voltage tester, **the load current and/or capacitance must be known to size the set**. The test voltage is determined by the standard followed, but the current needed is unknown.

What's Testing?



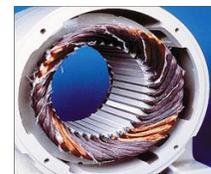
A vacuum bottle that draws 5-10 mAac



Rubber gloves maybe 40 mAac



A bushing could draw 100 mAac



Motor Winding – 300mAac



Iso Phase Bus: 0.5A – 1.0A



A cable pulling 5 amps

How Many mAac?

