



# Sizing an AC Dielectric Test Set

What kVA & Current Rating is Needed?

## AC High Voltage Testing. We know the test voltage, but what's the load current?

**AC high voltage testing requires higher current and power ratings** when compared to 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. This dictates the power required from the test set. Following are several considerations to make when specifying:

**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 on the **full voltage at the kVA rating**. Increasing the output voltage rating but at the same kVA 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 a 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 at least 25% extra power than needed.

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

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 @ 5kVac it will draw approximately 100 mA @ 50 kVac**.

**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 is approximately 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**. Generally, steel tank high voltage sections with bushing output are < 10pc while models with fiberglass HV sections and/or a cable output are not. PD ratings < 5pc are also available. Consult factory.

**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 applicable test standard. The current draw of the test object is the unknown. When selecting an AC high voltage tester or dielectric test set, **the load current and/or capacitance must be known to size the set**.

## What are you testing?



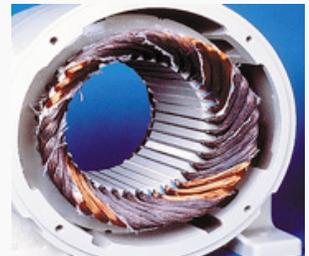
Vacuum Bottle ~5 - 10 mAac



Rubber Goods ~40 mAac



Bushings and Insulators ~100 mAac



Motor Windings ~300 mAac



Iso Phase Buss ~0.5 - 1 Aac



Shielded Power Cable ~5

## How many mAac?