

Vacuum Bottle HV Testing & Product Advice

When withstand testing bottles and similar devices:

- ⚡ Should high voltage AC or DC be used?
- ⚡ If both are acceptable, which is the best choice?

Application Overview

When testing most substation apparatus, motors, cables, aerial lifts, etc., the question is: can the item withstand an **AC over voltage test without failing**? In the case of a vacuum bottle, **is the vacuum chamber sealed with the vacuum intact or not**? Does it hold the test voltage or fail? Has there been a breach to the vacuum seal or maybe a breakdown or materials within? There is little in between. If considering DC voltage, there are no leakage currents to measure that are meaningful or consistent, DC or AC. **DC voltage does not replicate the AC stress** under service conditions and is not a reliable indicator of vacuum integrity. In fact, most bottle producers and their suppliers of the solid dielectric materials used within discourage the use of DC. As with many insulating materials, the constant negative polarity output of a DC hipot can be harmful to the materials and polarizing to the molecules within, leaving trapped space charges. Refer to your vendors testing guidelines for using AC.

Products Available for VB Testing

AC hipots are available from many vendors. Popular sizes for VB testing produce **30 kVac – 50 kVac for testing 15 kV rated gear and 65 kVac for testing 35 kV class**. The voltage rating is known, but the current rating must be considered. Depending on the capacitance of the load, higher mA ratings may be needed than anticipated. Look for a hipot design with **at least 25 - 40 mAac of output current**. A 10 mAac hipot can test one VB but not much else. Also, light weight and portability are critical to permit carrying the hipot as near to the load connection as possible. Some models offer a shielded cable output, making the connection safe and easy.

Variable DC Voltage output hipots should be designed with full wave bridge, highly filtered, low ripple outputs. Half-wave rectification designs can produce peak DC voltages up to twice the average voltage displayed on the meter. This situation can produce harmful xrays and possibly over voltage the bottles, causing false failures.

Fixed DC Voltage output designs with 5 or 6 selectable DC outputs with **green and red lights** indicating pass/fail may be suitable for VB testing, but can test little else. Why buy an **expensive, single purpose instrument** when a variable output, high mA rated AC hipot can test many different loads?

Review: AC voltage is best if only withstand testing
Buy > 25 mAac, or more, to make the hipot useful
Look for shielded cable output, one-piece designs



0 – 80 kVdc
@ 10 mAac