High voltage testing – Direct current (DC)

DC tests are used mainly to do “pressure tests” on high voltage cables. Although the cables operate with AC, AC testing is not practical. The high capacitance of the cables necessitates AC test sets with a high kVA rating to be able to supply the capacitive current. In the case of DC, once the cable is charged, only the losses have to be supplied.

DC test sets usually consist of half wave rectification, using HV selenium rectifiers. Typical DC test set-up is shown in Figure 1.
An **AC high voltage test transformer** is again supplied via a **variac** and a **rectifier** is used together with a filter **capacitor C** to limit the ripple to acceptable values. The earthing switch ES is a safety feature and closes automatically when the power is switched off to discharge the capacitor C.

Note that the peak inverse voltage required of the rectifier is **2 Vm**.

**Doubling and multiplier circuits** (as used in TV’s and household appliances) are also used to obtain an even higher voltage. A typical **Cockcroft-Walton** (in Germany: **Greinacher**) doubling circuit is shown in **Figure 2**.

**Resource:** *High Voltage Engineering Practice and Theory – Dr JP Holtzhausen; Dr WL Vosloo*