



Paleomagnetism Laboratory Procedure: Using the AF Demagnetizer

- 1) With the Minispin magnetometer up, running and calibrated, turn on the AF unit using the small black knob on the right side of the unit covering the Variac fuse.
- 2) Turn on the Variac of the AF unit using the large black dial, moving the dial so that it reads nearly full scale (9.8) on the analog meter.
- 3) You need to set several options before proceeding. First, you need to select the frequency with which the sample holder will reverse its direction of rotation about the vertical axis as it rotates about both vertical and horizontal axes. Choices are 1, 2, 4 or every first, second, or fourth rotations, or C which continuously reverses the core holder. Position 1 seems to work in most cases. You also need to set the rate of decay for the AF field, or how fast the AF field collapses to 0 Oe. A setting of B is appropriate in most cases.
- 4) Finally, you need to set the peak level of the AF field. This setting will obviously change as you demag each sample and its value depends upon the schedule of demag steps that you have chosen for your samples. Most rocks with magnetizations held primarily by magnetite will have most of their VRM and other secondary components removed at low AF levels. It is, thus, good to begin with a low AF level and work through small steps up to a level of about 200 Oe (30 mT) and use larger AF steps after 200 Oe. A typical routine of increasing AF level (in oersteds) is as follows;

25, 50, 75, 100, 125, 150, 175, 200, 250, 300, 400, 500, etc. (until dead)

never attempt to set a AF level below 25 Oe nor above 999 Oe.

Dial in the desired AF level using the small knob attached to the counter on the left side of the AF unit.

- 5) Put the sample into the plastic sample container, replace the lid and place container onto the sample holder cradle.
- 6) Begin the rotation of the sample holder by turning the lever on the left side of the AF unit. As the sample rotates, push the aluminum arm holding the sample into the shielded area until it stops.
- 7) Begin the AF cycle by pushing the "Start" switch. You will note that as the AF level rises to the set value, the "Up" light will be lit. After reaching the set point, the "Down" light will be lit meaning that the AF level is decreasing.
- 8) It is useful to turn on the oscilloscope to view the collapsing magnetic field as a sine wave of first increasing (during the "Up" phase) then decreasing (during the "Down" phase) amplitude.

9) After the cycle is completed (the oscilloscope signal goes flat and the "Ready" light is lit) and with the sample still rotating, pull the sample arm out of the shielded area. and turn off the rotation switch.

10) Take the sample out of the container and put into the measuring cube of the magnetometer. You should do this in a fairly timely manner, especially during the later stages of demagnetization of a sample, to prevent the now-randomized, low-coercivity grains from acquiring an IRM in the present Earth's field. Getting the sample into its cube and down into the shielded area of the magnetometer will prevent this. If you cannot finish demagnetizing a sample completely in one session, end your session after a measurement on the magnetometer but before the next AF level. Store incompletely demagnetized samples in the storage shield.

11) Shutting Down Procedure: When your AF session is complete, it is a good idea to discharge the capacitors of the unit before switching the unit off. To do this, turn the large, black Variac dial to '0' then press the "Start" button. You should see the capacitors discharge via the analog meter. As the meter reads a very low number, you can switch off the AF unit with the small switch on the right side of the unit.