

Hk Measurements on Shb Instruments Magnetic Measurement Systems

There are two Hk commands, Hk% and HkDrv. All versions of Hk measurement rely on the same core algorithm. The slope of the transition region of the hard axis loop is first estimated. This estimated slope is extrapolated to intersection with the previously measured Bs value, and the horizontal coordinate of the point of intersection is reported as Hk. So the question is how is this slope estimated. Since not all hard axis loops have ideal, linear transition regions, there is no one correct technique. The “%” form of Hk actually reduces the amplitude of the drive field until the hard axis loop degenerates to a short, tilted line segment, the slope of which is easily measured. The “%” parameter in the advanced settings box for Hk% specifies the % of Bs which is the target for the vertical amplitude of the resulting line segment. The instrument will reduce the drive field amplitude until the vertical amplitude of the resulting segment is the specified % of BS.

The “Drv” form of the Hk measurement does not reduce the drive amplitude, but rather estimates the slope of the transition region by defining two points, one toward each side of the transition region, and measuring the slope of the line connecting these two points. The location of these two points is specified by their horizontal coordinates (i.e. the drive level at which the points are defined). This drive level is specified in the advanced settings box for the HkDrv command. If this box is left blank, the points used will be those points in the transition region which have a vertical coordinate equal to $\frac{1}{2}$ of Bs, and this computed value will be reported in the Drive field of the Hk measurement that appears in the results window.

The “u” in HkuDrv or Hku% refers to “unstressed” and the “s” in Hks% is for “stressed”. These versions are used to do the magnetostriction measurement, where Hk (of either type) is measured before and after stress is applied to the sample.

