How do you measure magnetic fields in Gauss, Oersted, Tesla and other standard units?

The traditional CGS units for measuring magnetic fields are Gauss and Oersted. Magnetic flux density is measured in Gauss, while magnetic field intensity is measured in Oersted. The ratio of B, magnetic flux, in Gauss, to H, magnetic field, in Oersted, is defined as permeability, "µ" (pronounced "mew"). The B/H ratio, or "µ", is a measure of the material's properties. It is high for ferromagnetic materials. In air, however, Gauss and Oersted are identical numerically. The modern S/I or Metric system prefers the Tesla and Ampere-turns/meter units for magnetic flux density and magnetic field intensity, respectively. Conversions are shown in the table below.

Magnetic Properties Conversion Table

Property	CGS unit	S/I Unit	Conversion
Magnetic Flux	Line (or Maxwell)	Weber	1 Weber = 10^8 Lines
Flux Density (B)	Gauss	Tesla	1 Tesla = 10^4 Gauss
Magnetomotive force	Gilbert	Ampere-turn	1 Gilbert = 0.796 ampere-turn
Magnetizing Force Field (H)	Oersted	Ampere-turn/ meter	1 Oersted = 79.577 ampere-turn/meter
Permeability	Gauss/ Oersted	Weber/ m-ampere-turns	

Often prefixes are used to make the quantities more manageable. For instance, we may speak of magnetic fields in milliGauss, where 1000 milliGauss (mG) are equal to one Gauss. Because a Tesla is a large amount of magnetic flux, fields are often described in mT (milliTesla) or µT (microTesla). 10 milliGauss are equal to one micro-Tesla.

You may notice that the magnetic fields are sometimes described in technical literature as fields and sometimes as magnetic flux. In air, the magnitudes of magnetic field (in Oersted) and magnetic flux (in Gauss) are numerically equal, so the terms are sometimes used imprecisely, leading to such confusion. In air, relative permeability, μ_r, is equal to one, so the numerical magnitudes are the same.