Glossary

AC FLUX DENSITY (GAUSS) Number of flux lines per unit of cross-sectional area generated by an alternating magnetic field.

AMPERE TURNS (NI) the product of current (I) flowing in the winding times the number of turns (N).

B-H CURVE Curve to show characteristics of a magnetic material, in terms of magnetizing force (H) and resulting flux density.

COPPER LOSS (WATTS) The power absorbed by a coil subjected to an alternating current.

CORE Magnetic material placed within and around a coil to provide a path of lower reluctance for magnetic flux.

CORE LOSS Sum of hysteresis and eddy-current loss in a magnetic core.

CURRENT RATING (Idc) is the maximum recommended DC current for the inductor. Expressed in milliamps (mA) or amps (A) maximum. This is limited by the allowable temperature rise.

DCR is the direct current (DC) resistance offered by an inductor due to the resistance of the magnet wire used to wind. Expressed in ohms or milliohms maximum. This is an undesirable characteristic, which is a byproduct of the wire or conductive material used. The lower the DCR, the more current an inductor will handle.

FLUX Product of the average component of magnetic induction perpendicular to any given surface in a magnetic field by the area of that surface, expressed in webers.

FLYBACK TRANSFORMER Transformer used in a flyback power supply. Also called horizontal output transformer.

INCREMENTAL CURRENT (dI) is the amount of DC current which causes the inductor to lose a small percentage of its inductance (starting to saturate); only of concern on Shielded or High Current Inductors. Expressed in milliamps (mA) or amps (A). It is specified only when its value is less than the rated current.

INDUCTANCE The property of a circuit element that opposes changes in Alternating Current (AC). Expressed in millihenries (mH), microhenries (uH), or nanohenries (nH) and should carry a tolerance (i.e.±5% or ±10%). Inductance does vary as a function of frequency; the higher the frequency, the higher the inductance of a given device up to its SRF (self resonant frequency). As a rule, the inductance remains relatively constant past its Test Frequency.

INDUCTORS are electrical components that oppose any change of AC current by means of storing energy in a magnetic field.

INITIAL PERMEABILITY (NO) Permeability = μ = B/H Initial permeability is that value of permeability when Bac = 10gs.

IRON-CORE COIL/ TRANSFORMER Coil/transformer wound around an iron core to increase its inductance. At audio frequencies the iron core consists of laminations of silicon steel insulated from each other by varnish or shellac. At radio frequencies the core consists of powdered iron mixed in a binder which insulates the particles from each other.

ISOLATION TRANSFORMER Transformer with a one-to-one turns ratio, connected between the a.c. power input to a piece of equipment and the a.c. line, to minimize shock hazard.

LOAD LOSS These losses are caused by the resistance of the windings under loaded conditions.

MAXIMUM POWER DISSIPATION An inductor's ability to handle the heat generated by operating at maximum current at an ambient temperature, expressed in Watts (W) or milliwatts (mW). This is a function of the body area of the inductor, core material used, and varies for shielded vs. unshielded.

NO LOAD LOSS (CORE LOSSES) These losses are caused by the magnetizing of the core and are always present. The way they are measured is by running full voltage with no load on the transformer.

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OPERATING TEMPERATURE RANGE specifies the temperature extremes at which the inductor will operate safely. At the maximum temperature specified, allowance must be made for the “Temperature Rise” created by heating effects of using the inductor at its maximum current rating. Normally, API uses 90 degrees Celsius as ambient temperature for rating current; thus 125 degrees operating minus 90 degrees ambient, allows 35 degrees for temperature rise.

PERMEABILITY (u) By definition u = B/H, where B is the flux density in gauss and H is the magnetizing force in oersteds.

POWER TRANSFORMER Magnetic-core transformer for operation at 60 hertz, with nearly zero source impedance, to transfer power from line voltage to some required voltage.

PRIMARY WINDING The winding connected to the source of energy.

Q is Quality Factor of an Inductor relating to the amount of energy lost while an AC current is passing through it. It is expressed as a minimum value (i.e. 50 minimum). In most applications the higher the value of Q, the better the inductor will perform.

SRF is the inductor's self resonant frequency; the frequency at which the inductor looks electrically capacitive, rather than inductive. Expressed in megahertz (MHz) minimum. The higher the value, the greater the range of frequency use. An inductor should never be used at or beyond its SRF (Self Resonant Frequency).

SECONDARY WINDING The winding is the coil where energy is induced from the primary.

SHIELDED inductors have internal iron or ferrite around the entire winding to prevent unwanted signals from escaping and interfering with the other components in the immediate area.

STEP UP TRANSFORMER When the secondary is at a higher voltage than the primary.

STEP DOWN TRANSFORMER When the secondary has a lower voltage than the primary.

SATURATION Maximum density of magnetic flux that can be present in a magnetic material.

TEMPERATURE COEFFICIENT OF INDUCTANCE (T_C of L) is the value of inductance change as a function of temperature exposure, normally expressed in parts per million per degrees Celsius. This is a calculation comparing inductance at a reference temperature (25°C, room ambient) to the extremes and other temperatures within operating range. Can be called Percent Delta L or Temperature Stability; the lower the change the better for most applications.

TEST FREQUENCY is the industry/military standard for testing a range of inductances. It is not intended as the application frequency. Expressed in megahertz (MHz) or kilohertz (KHz).

TURN RATIO The ratio of the primary voltage (or turns) to the secondary voltage (or turns).

VOLT-AMPERE (VA) In an a.c. circuit, a measure of apparent power, given by: VA =EI, where E is the potential in volts; I is the current in amperes; and VA is apparent power in volt-amperes