# MPP Temperature and Linear Stabilization

Magnetics MPP cores are provided in three basic temperature stabilizations; Standard, Controlled, and Linear. Typical and guaranteed inductance limits for these temperature stabilizations are illustrated on the following pages.

Standard cores are offered with three different finishes (A2, A5, or A9). Controlled and Linear cores are offered with a D4, M4, W4 and L6 finish, respectively. See page 1-3 for size and permeability availability.

The inductance of MPP cores is affected by temperature changes, which cause variations in the amount of distributed air gap (insulating material). The expansion characteristics of powdered metal, insulating material, and core finish all contribute to the inductance change arising from temperature changes.

The temperature coefficient of inductance can be controlled by the addition of a small percentage of special compensating alloys, which have curie points within the temperature range being controlled. When each curie point is exceeded, these particles become non-magnetic and act as additional air gaps; thus the change in inductance is minimized over a predetermined temperature range. MPP cores can thus be utilized in precision circuits requiring extremely high inductance stability over wide temperature ranges.

Magnetics standard cores (A2, A5, A9 Stabilization) offer the expected temperature performance shown on page 3-12. If guaranteed temperature performance is necessary, Controlled or Linear cores are recommended.

Magnetics MPP cores are offered in three controlled stabilizations, D4, W4, and M4 to provide high levels of inductance stability over temperature per the chart listed below. Stabilization is effective only to initial permeability or when cores are driven at low induction (<100 gauss).

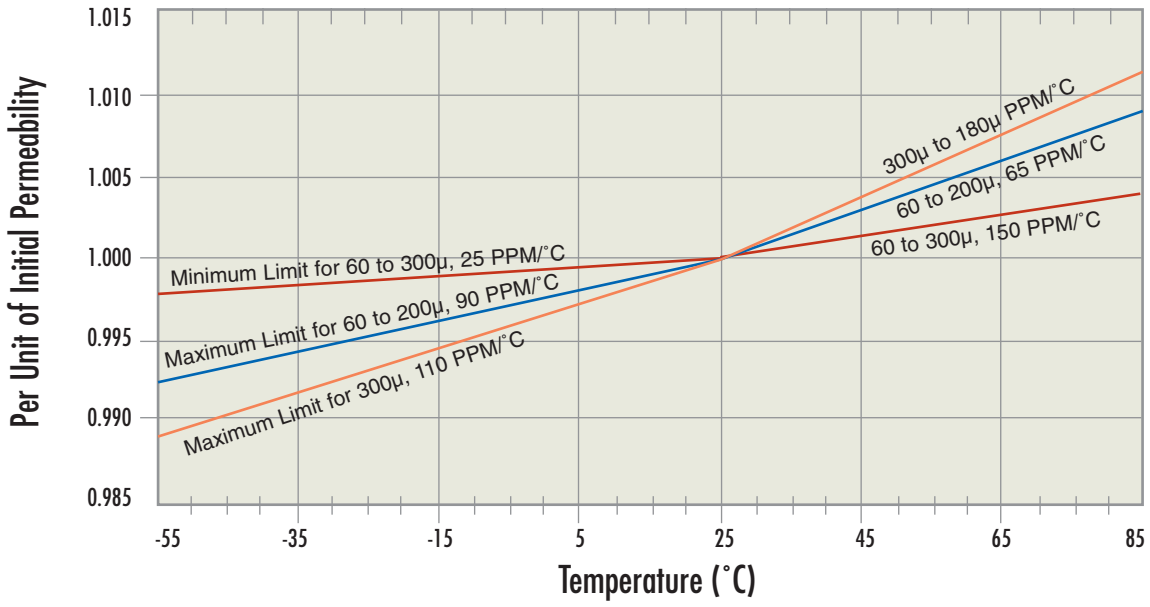
MPP cores are also offered with linear temperature characteristics, L6. Linear cores provide a temperature coefficient, from -55°C to +85°C, which can be matched with a 100ppm polystyrene capacitor to yield extremely stable tuned circuits. Temperature coefficient values are referenced to 25°C.

The temperature stability of MPP cores can be affected by external factors such as moisture, winding stresses and potting compounds. These effects can be minimized by using suitable stability procedures during the coil fabrication process. Please see Inductor Stabilization Procedure on page 1-7.

| Part No. Suffix | Stabilization Type | Inductance Stability Limits | Stabilized Temperature Range | Guaranteed Minimum Breakdown |
|---|---|---|---|---|
| D4 | Controlled | ± 0.1% | 0˚C to +55˚C<br>+32˚F to +130˚F | 500 volts |
| W4 | Controlled | ± .25% | -55˚C to +85˚C<br>-67˚F to +185˚F | 500 volts |
| M4 | Controlled | ± .25% | -65˚C to +125˚C<br>-85˚F to +257˚F | 500 volts |
| L6 | Linear | See page 1-7 | -55˚C to +85˚C<br>-67˚F to +185˚F | 500 volts |

M4 cores meet the W4 limits and may be substituted in place of W4. Stabilized only available in 60-200 perm in O.D.s from 6.35 mm (0.25") - 57.2 mm (2.25").

# MPP Linear Cores Guaranteed Limits




# MPP Inductor Stabilization Procedure

Magnetics MPP cores possess excellent inductance/time stability. Under typical shelf life conditions the inductance of an unpotted core will shift less than 0.5%.

If maximum stability is desired, the following precautions and procedures will remove winding stresses and core moisture and provide inductance stabilities better than 0.05%.

1. Wind cores to the approximate specified inductance (slightly over the desired value).
2. Cool wound cores to -60°C. Maintain at temperature for 20 minutes to help relieve winding stresses caused by high winding tension, large wire, or many turns.
3. Heat cores slowly (<2°C/minute) to 115°C. Maintain at temperature for 20 minutes.
4. Steps 2 and 3 should be repeated twice.
5. Bake at 115°C for 16 hours.
6. Cool to room temperature and adjust turns to obtain specified inductance.
7. Cores must be kept dry until potted or hermetically sealed.
8. If the cores are to be potted, they should be covered first with a cushioning material, such as silicone rubber. This material minimizes the possibility of the potting compound stressing the core and changing the inductance value.
9. Potting compounds should be chosen with care, as even semi-flexible resins can cause core stresses and reduce stability. Selection should be based on minimum shrinkage and minimum moisture absorption.