

ENGINEERING PRACTICE STUDY

TITLE: Thermal Cycling test method for ferrite cores

22 March 2021

STUDY PROJECT

FINAL REPORT

Study Conducted By DLA Land and Maritime

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- I. OBJECTIVES. The objective of this study is to determine whether an option to use Thermal Cycling is a good alternative to Thermal shock. MIL-STD-202-107 is the prevailing test procedure but it is an uncontrolled rate of change as compared to a Thermal Cycle (i.e. $X^{\circ}\text{C} \pm Y^{\circ}\text{C} / \text{minute}$ change)...and for some programs the Thermal Shock is considered an unnecessary over stress to the component. Since there is no other outlet in MIL-STD-202 to temperature stress, method 107 is settled for.
A thermal cycle would have a ($T_{\min}$) minimum and ($T_{\max}$) maximum temperature with a given rate of change between 3 - 8 $^{\circ}\text{C}/\text{minute}$. Also, should a new test procedure for Thermal cycling be added to MIL-STD-202 and MIL-PRF-27 or just MIL-STD-202 and have MIL-PRF-27 reference MIL-STD-202?
- II. BACKGROUND. There has been customer concerns over Thermal Shock testing ferrite core designs. Specifically the rapid rate of change between temperature extremes as being hazardous to the cores and potentially causing cracking of the ferrite.
- III. RESULTS. The document was reviewed and comments were generated.
- IV. CONCLUSIONS. A total of 6 commentors. 5 Commentors would like to see a procedure added to MIL-STD-202-XXX and for MIL-PRF-27 to reference MIL-STD-202-XXX as needed.
- V. RECOMMENDATIONS. EP Study finds that a new thermal cycling method needs to be added to MIL-STD-202.