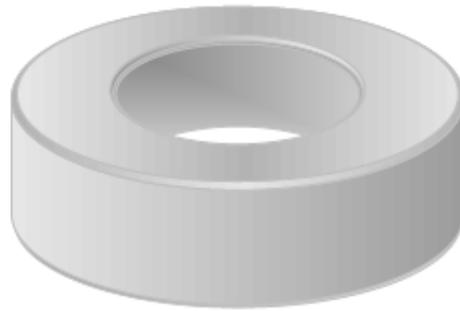


IMA-STD-140 2011.03



Standard Specifications for
Ferrite Toroid Cores

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FOREWORD

This standard on ferrite toroids was developed by the Soft Ferrite Technical Committee of the Magnetic Materials Producers Association. The following International Electrotechnical Commission (IEC) publications have been used in part or in total for developing this standard:

IEC-525 Dimensions for Ring Cores of Ferromagnetic Oxides

IEC-424 Guide to the Specification of Limits for Physical Imperfections of Parts Made from Magnetic Oxides

IEC-205 Calculation of Effective Parameters of Magnetic Piece Parts

ISO Recommendation R370 was used in the conversion of tolerance dimensions from inches into millimeters and vice versa.

This core standard is only an advisory document, and its use is entirely voluntary.

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Standard Specifications for Ferrite Toroid Cores

1.0 Scope

This standard defines a series of ferrite toroid cores and their dimensions, tolerances, and dimensional core constants. The sizes shown are intended to show the dimensions and tolerances of popular sizes available from many manufacturers.

This listing is not intended to promote usage of the listed parts over sizes not listed. Toroid core tooling is simple and inexpensive so that there are many sizes not listed that are in wide usage and available from many sources. Ferrite toroid core height can be varied without tooling changes so the listed cores are available in many core heights not shown in Table I.

2.0 Dimensions and Tolerances

Table I
DIMENSIONS FOR STANDARD SERIES OF FERRITE TOROID CORES

Core Designation	d ₁				d ₂				h			
	mm	+/-	in	+/-	mm	+/-	in	+/-	mm	+/-	in	+/-
T2.5	2.54	0.1	0.100	0.01	1.50	0.1	0.059	0.003	0.99	0.08	0.04	0
T3.5	3.94	0.1	0.155	0.01	2.24	0.1	0.088	0.003	1.27	0.08	0.05	0
T4.8	4.83	0.1	0.190	0.01	2.29	0.1	0.090	0.003	1.27	0.08	0.05	0
T5.8	5.84	0.2	0.230	0.01	3.05	0.1	0.120	0.005	1.52	0.08	0.06	0
T7.6	7.62	0.20	0.300	0.01	3.18	0.1	0.125	0.005	4.78	0.13	0.19	0.01
T9.5	9.53	0.20	0.38	0.01	4.75	0.1	0.187	0.005	3.18	0.13	0.13	0.01
T12.7	12.7	0.30	0.500	0.01	7.92	0.20	0.312	0.008	6.35	0.18	0.25	0.01
T15.9	15.9	0.4	0.625	0.01	8.89	0.20	0.350	0.008	4.70	0.13	0.19	0.01
T22.1	22.1	0.5	0.870	0.02	13.7	0.30	0.540	0.012	6.35	0.18	0.25	0.01
T25.4	25.4	0.8	1.000	0.030	15.5	0.4	0.610	0.014	9.53	0.20	0.38	0.01
T29.0	29.01	0.8	1.142	0.030	19.00	0.4	0.748	0.016	7.49	0.18	0.3	0.01
T36.0	36	0.8	1.417	0.030	23	0.5	0.906	0.020	15.24	0.36	0.6	0.01
T38.1	38.1	1	1.500	0.040	19.1	0.4	0.750	0.016	6.35	0.18	0.25	0.01
T50.8	50.8	1.3	2.000	0.050	31.8	0.8	1.250	0.030	19.05	0.41	0.75	0.02
T61.0	61	1.3	2.400	0.050	35.6	0.8	1.400	0.030	12.70	0.30	0.5	0.01
T73.7	73.70	1.5	2.900	0.060	38.9	1	1.530	0.040	12.70	0.30	0.5	0.01

rounded (4x)

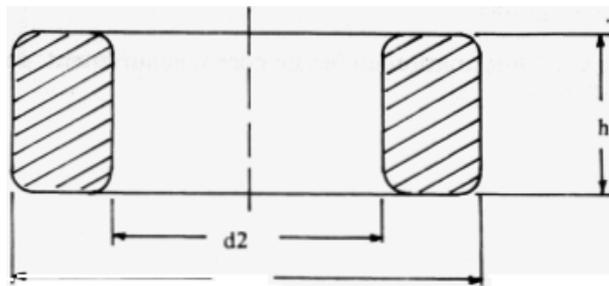


Figure 1

Core Designation	Core Constants		Effective Parameters		
	C1*(cm ⁻¹)	C2*(cm ⁻³)	le(cm)	Ae(cm ²)	Ve(cm ³)
T2.5	135.00	29900.00	0.606	0.005	0.003
T3.9	92.10	9230.00	0.920	0.010	0.009
T4.8	68.60	4610.00	1.020	0.015	0.015
T5.8	65.10	3250.00	1.300	0.020	0.026
T7.6	15.20	155.00	1.500	0.098	0.147
T9.5	28.90	404.00	2.070	0.072	0.148
T12.7	21.20	143.00	3.120	0.148	0.461
T15.9	23.20	147.00	3.680	0.158	0.583
T22.1	20.90	80.80	5.420	0.259	1.400
T25.4	13.40	29.10	6.170	0.460	2.840
T29.0	19.90	54.30	7.320	0.367	2.690
T36.0	9.25	9.54	8.970	0.969	8.690
T38.1	14.40	24.80	8.300	0.578	4.790
T50.8	7.03	3.95	12.500	1.780	22.200
T61.0	9.20	5.86	14.500	1.570	22.700
T73.7	7.75	3.63	16.500	2.130	35.200

Core Constant Definitions:

- 2.1 Core Constant C1 (cm⁻¹): The magnetic path length divided by the core area corrected for rounded corners.
- 2.2 Core Constant C2 (cm⁻³): The magnetic path length divided by the square of the core area corrected for rounded corners.

For additional information on core constants, see IEC-205.

3.0 General

- 3.1 Ferrite toroids are available in a variety of ferrite materials with Initial permeabilites ranging from less than 10 to over 15,000.
- 3.2 Ferrite toroids normally have a +/-20% tolerance on A L (inductance factor in nanohenries/turn²). For high permeability materials, the tolerance is often wider than +/-20%.

Unless otherwise specified, the test conditions for inductance factor are at a flux density +/-10 gauss.

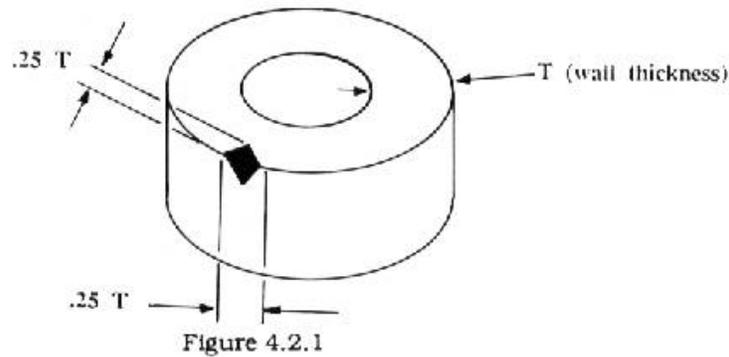
For additional information on ferrite core measurement, see Soft Ferrite User's Guide, MMPA SFG-92.

4.0 Surface Conditions and Appearance of Uncoated Ferrite Toroid Cores

4.1 Cleanliness

Surface should be clean and free of adhering ferrite or foreign particles.

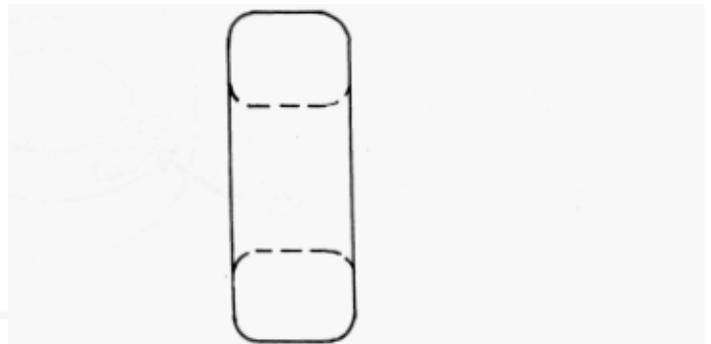
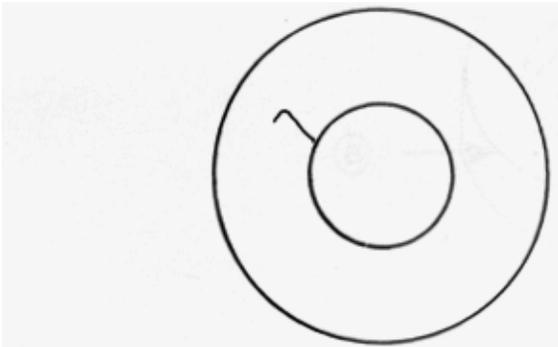
4.2 Visual Appearance of Ferrite Toroids



4.2.1 Chips shall not exceed 25% of the wall thickness in length and width up to a maximum of 2.5mm (.1 inch). (See figure 4.2.1)

4.2.2 Chips must be smooth with no sharp or rough edges.

4.2.3 The maximum number of chips per



any core edge shall not exceed three or exceed six total on all surfaces when viewed without magnification.

4.2.4 Any deviation in shape must be within the specified dimensional tolerances The toroid corners shall not be sharp or rough.

4.2.5 The toroid corners shall not be sharp or rough.

Figure 4.2.2

4.2.6 Radial cracks visible without magnification are not permitted.

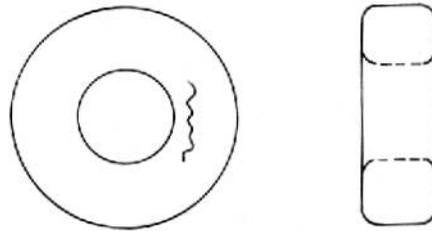


Figure 4.2.3
Figure 4.2.3

4.2.7 The overall length of circumferential cracks shall be less than 25% of core circumference.

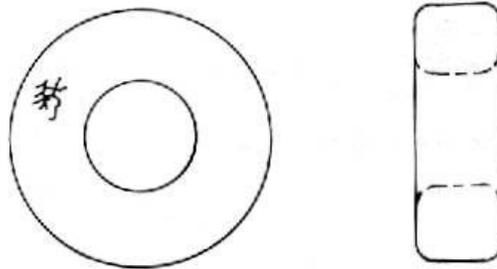


Figure 4.2.4

4.2.8 Crazeing or pullout shall not exceed 25% of the affected core surface area.

4.2.9 Cores with visual irregularities must meet specified electrical requirements.

5.0 Coated Toroids

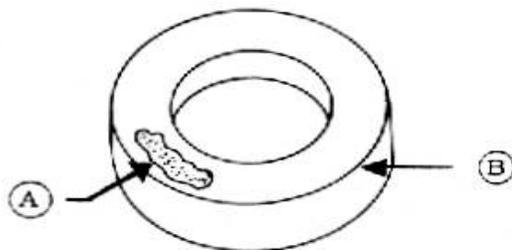


Figure 5.1.0

- 5.1 Rough core coating is unacceptable. (A)
- 5.2 Chip in coating exposing the bare core is unacceptable. (B)

- 5.3 Thin coating exposing the bare core in any area is unacceptable.
- 5.4 The finish must meet specified voltage breakdown requirements.

- 5.5 Core finishes are tested for voltage breakdown by Inserting the core between two conductive rubber or rubber backed mesh pads. A force is applied to the pads to produce a uniform pressure of 10 psi, simulating typical winding pressure. Test is conducted using a 60 Hz rms voltage.