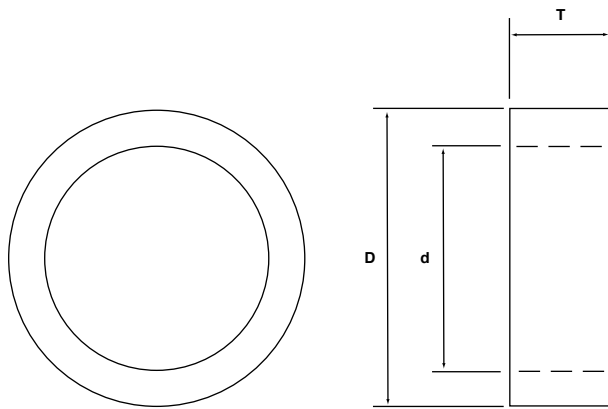


Toroidal cores



Toroidal cores



WILTAN Toroidal Cores are supplied in numerous sizes and grades of material.

Cores can be manufactured in material thicknesses 0.3mm, 0.1mm and 0.05mm.

The various forms of toroids are as follows: -

- a) Uncut, not impregnated
- b) Uncut, treated for added rigidity
- c) Cut and impregnated

Range of Diameters

Imperial	Metric
Smallest Inside ½"	12.5mm
Largest Outside 54"	1372mm

Preferred Strip Widths

Refer to preferred strip width quoted on Page 6.

Limits of Tolerance

$d \pm \frac{1}{32}"$ up to 6" $d \pm 0.8\text{mm}$ up to 152mm

Over 9" by agreement

$D \pm \frac{1}{32}"$ up to 9" $D \pm 0.8\text{mm}$ up to 240mm

Over 6" by agreement

$T - 0$ for cores less $+ \frac{1}{32}"$ than 9" O/D	$T - 0$ for cores less $+ 0.8\text{mm}$ than 240mm O/D
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$T - 0$ for cores over $+ \frac{1}{16}"$ 9" O/D	$T - 0$ for cores over $+ 1.59\text{mm}$ 240mm O/D
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The various forms of finishes are as follows: -

- a) Uncut, non-impregnated.
- b) Uncut, lightly impregnated with varnish.
- c) Uncut, fully impregnated with resin.
- d) Cut and fully impregnated with resin.
- e) Multi cut fully impregnated with resin.
- f) Supplied with plastic end cheeks, polypropylene (Max Temp 90°C), Crastine (Max Temp 130°C).
- g) Insulated vacuum wrapped with polypropylene (Max Temp 90°C).
- h) Epoxy resin coated (Max Temp 170°C).

NOTE

It should be noted that with an epoxy coated Toroidal Core, the coating thickness is normally:

0.025" \pm 0.005 (0.64mm \pm 0.12mm)

Calculation of Core Weights

Nominal Finished Weight per Core = $KT(D + d)(D - d)$ Kilos

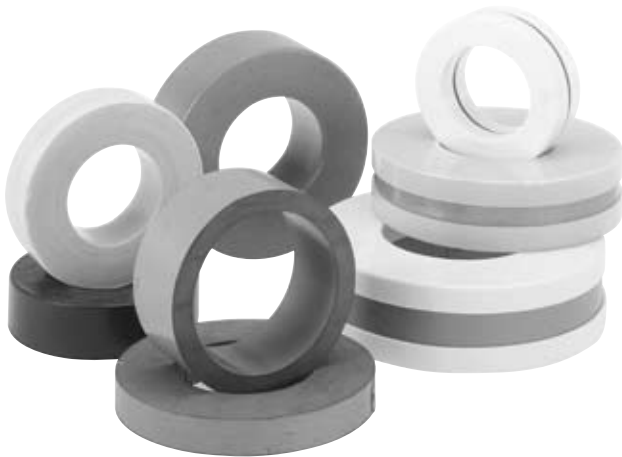
Where D = Outside diameter
d = Inside diameter
T = Stripwidth

Where Dimensions are in inches
 $K = \pi/4 \times 126 \times SF$

Where Dimensions are in millimetres
 $K = \pi/4 \times 7.65 \times SF \times 10^{-6}$

SF for 0.3mm material is 0.95
0.1mm material is 0.92
0.05mm material is 0.88

As already stated, Toroidal Cores may be manufactured in a great variety of sizes. As an indication of the smaller dimensional cores that are available on request, we detail below the cores as listed in Defence Specification 5193.



Style H.W.T.	Dimensions in Inches			Mean Perimeter Cms	Gross Cross Section cms
	d	D	T		
4/4	1/2	13/16	1/4	5.25	.252
4/8	1/2	1	1/2	6.00	.807
6/3	3/4	1 1/8	3/16	7.50	.227
6/5	3/4	1 1/8	5/16	7.50	.348
7/3	7/8	1 5/16	3/16	8.75	.264
7/5	7/8	1 5/16	5/16	8.75	.440
7/7	7/8	1 5/16	7/16	8.75	.616
8/4	1	1 1/2	1/4	10.00	.403
8/6	1	1 1/2	3/8	10.00	.605
8/8	1	1 1/2	1/2	10.00	.807
10/4	1 1/4	1 7/8	1/4	12.50	.504
10/6	1 1/4	1 7/8	3/8	12.50	.756
10/8	1 1/4	1 7/8	1/2	12.50	1.010
12/4	1 1/2	2 1/4	1/4	15.00	.605
12/6	1 1/2	2 1/4	3/8	15.00	.907
12/8	1 1/2	2 1/4	1/2	15.00	1.210
14/5	1 3/4	2 5/8	5/16	17.43	.882
14/7	1 3/4	2 5/8	7/16	17.43	1.230
14/9	1 3/4	2 5/8	9/16	17.43	1.580
16/5	2	3	5/16	20.00	1.010
16/7	2	3	7/16	20.00	1.410
16/9	2	3	9/16	20.00	1.810
18/5	2 1/4	3 3/8	5/16	22.42	1.130
18/7	2 1/4	3 3/8	7/16	22.42	1.590
18/9	2 1/4	3 3/8	9/16	22.42	2.040

Toroidal Cores

Performance Guarantees:-

Non-impregnated Toroidal Cores are normally offered with the following standard guarantees

Material	Test Frequency	Flux Density	Limit:
0.3mm GRADE M4	50 Hz	1.0 Tesla	19.0 A/M
0.3mm GRADE M5	50 Hz	1.0 Tesla	20.0 A/M
0.1m	400 Hz	1.5 Tesla	26.5 VA/Kg 17.5 Watts/Kg
0.05mm	400 Hz	1.2 Tesla	17.5 VA/Kg 12.5 Watts/Kg

Magnetic degradation occurs when Toroidal Cores are impregnated with varnish or epoxy coated and, as a guide, the increased losses expected are as shown below:-

Lightly impregnated in varnish	+ 15%
Fully impregnated in epoxy resin	+ 20%
Epoxy coated	+ 40%

WILTAN 'TS' NON-IMPREGNATED TOROIDAL CORES

Wiltan's 'TS' non-impregnated Toroidal cores are made from HiB 0.3mm grain oriented silicon steel and demonstrate extremely good magnetic properties at low and high flux densities.

The cores are particularly suited to current and voltage transformer applications requiring high accuracy and can sometimes replace cores made from more costly materials. In such cases, an immediate saving is apparent.

Performance Guarantees

Curves showing the power, quadrature and total magnetising components of 'TS' Cores are shown in the Engineering Section of this publication and, for comparison, similar curves for cores made from the best normally available grain oriented silicon steel.

'TS' Cores are normally tested and guaranteed at 2 points on the magnetisation curve: -

1. 0.3 Tesla – 6.5 A/M
2. 1.0 Tesla – 16.0 A/M

Other points of guarantee can be agreed to customers' preferred test conditions.

Mechanical Parameters

To achieve the guarantee performance figures shown above, 'TS' cores must comply with the following dimensional parameters.

- a) Inside diameter must be greater than 30mm
- b) The ratio of $\frac{\text{Inside Diameter}}{\text{Strip Width}}$ must be greater than 1.

'TS' Cores which are required outside these mechanical parameters should be referred to Wiltan for evaluation.

