

Toroidal Core shape is unique, because when fully wound, it has the capacity to contain all of the flux with minimal fringing. They also excel at dissipating winding heat. Without a mating surface they provide a high effective perm. There is increased winding complexity, but decreased bobbin and assembly costs.

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MATERIALS

Our standard coating is Sherwin Williams Polane 2.8T Plus, 2 part Polyurethane Coating.

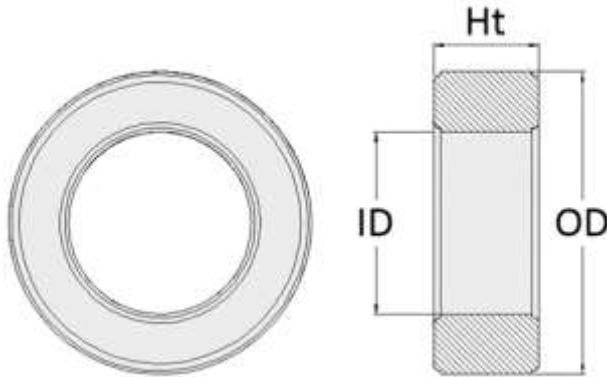
Dielectric Strength

500 Vrms 60 Hz, for the standard single coat. Additional layers maybe applied.

Thickness

0.002"-0.004" Single Coat. This must be added to the core dimensions on the following pages.

[SHERWIN WILLIAMS LINK](#)

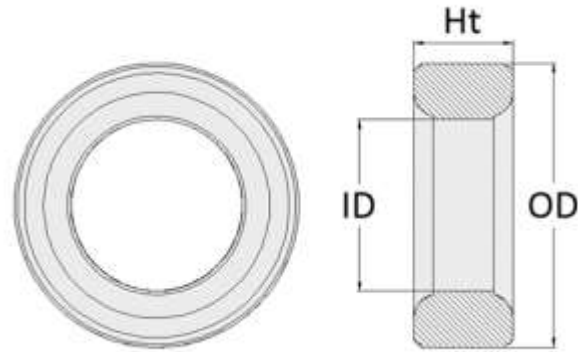


Toroid edges can have different finished such as radii, chamfers. The sharp corners are tumbled and removed.

Our toroid radii were determined by the original customer requirements. The customer choice depended upon the application.

ID/OD RADIUS

This is the default edge.



LARGER ID RADIUS

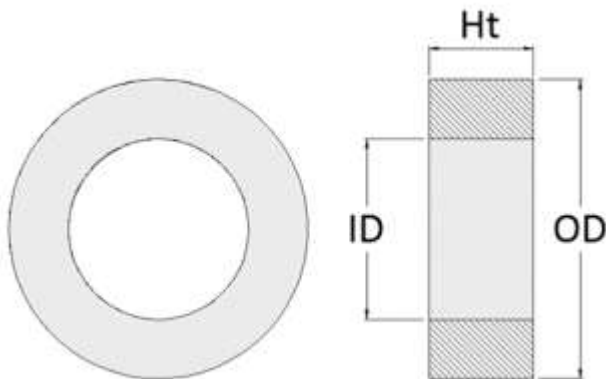
If a larger diameter wire is to be used a larger radius on the inner diameter of the toroid is used.

SHARP EDGE

Fine wire on a small toroid usually resulted in sharp edges on the toroid, that are slightly rounded in tumbling.

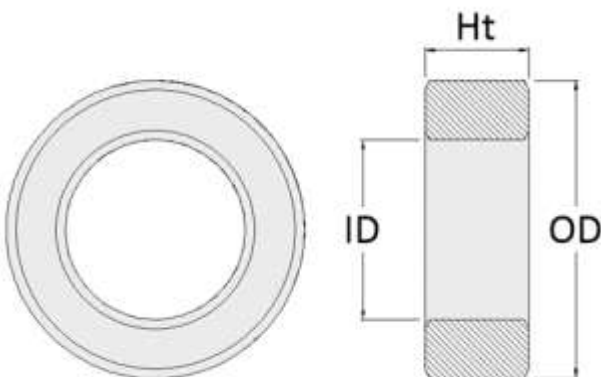
CHAMFERED EDGE

Chamfered toroid is usually used where they are stacked and a larger contact area is desired, with some allowance for wire bending.



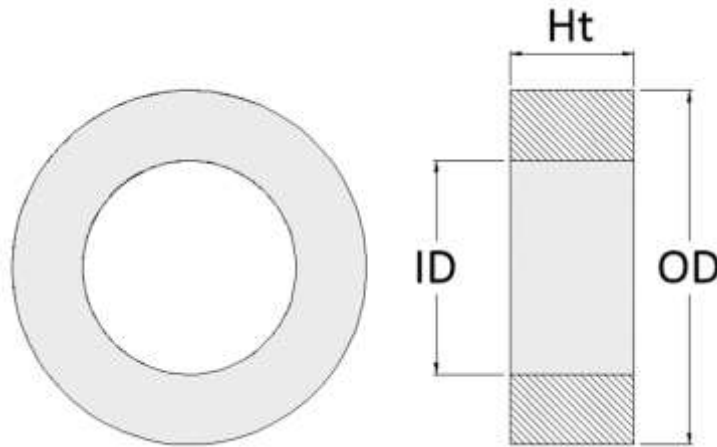
UN-TUMBLED

In some cases a customer will request a toroid that is not tumbled, because they use a plastic case or have a means to prevent the sharp edges from interfering with the application.



CHANGES

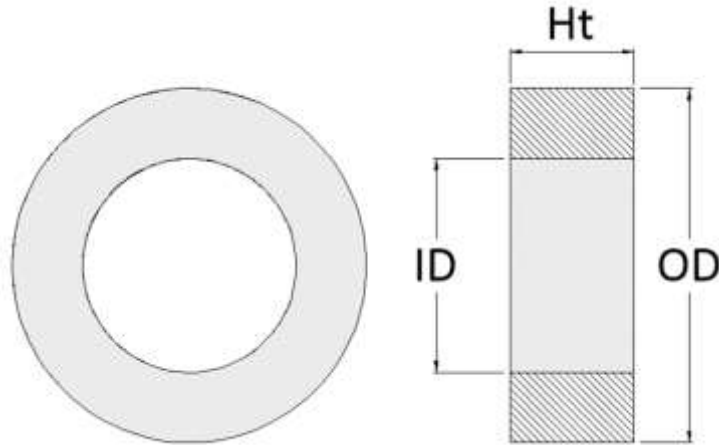
If you require a special edge, new punches can be made.



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
10-05-03	9.53	0.19	4.75	0.09	3.18	0.06
10-05-04	9.53	0.19	4.75	0.09	3.30	0.07
10-05-06	9.53	0.19	4.75	0.09	6.35	0.13
10-05-08	9.53	0.19	4.75	0.09	6.60	0.13
10-05-17	9.53	0.19	4.75	0.09	17.02	0.34

Catalog #	L_e	A_e	V_e	W_a	$W_a A_e$	Weight
	mm	mm ²	mm ³	mm ²	mm ⁴	Grams
10-05-03	20.71	7.28	150.8	0.71	5.19	0.82
10-05-04	20.71	7.57	156.8	0.71	5.40	0.85
10-05-06	20.71	14.56	301.6	0.71	10.38	1.64
10-05-08	20.71	15.15	313.7	0.71	10.79	1.71
10-05-17	20.71	39.03	808.4	0.71	27.81	4.40

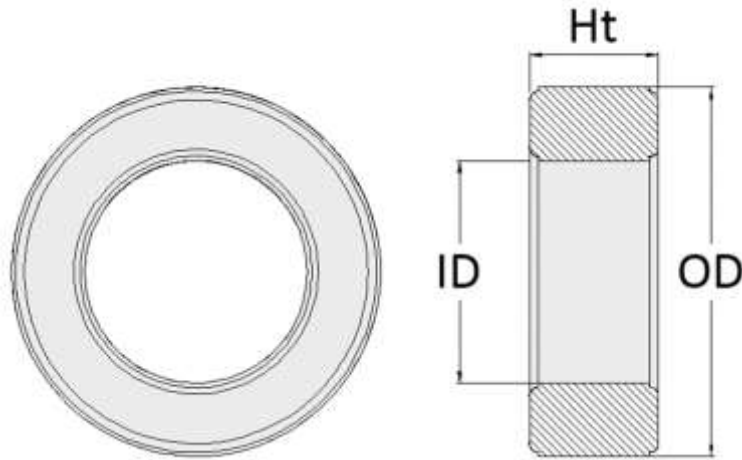
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
10-05-03	884	972	1326	2209	3093
10-05-04	919	1011	1379	2298	3217
10-05-06	1767	1944	2651	4418	6186
10-05-08	1838	2022	2757	4595	6433
10-05-17	4737	5210	7105	11841	16578



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
11-07-03	11.13	0.22	7.11	0.14	2.97	0.06

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
11-07-03	27.71	5.86	162.5	0.97	5.70	0.83

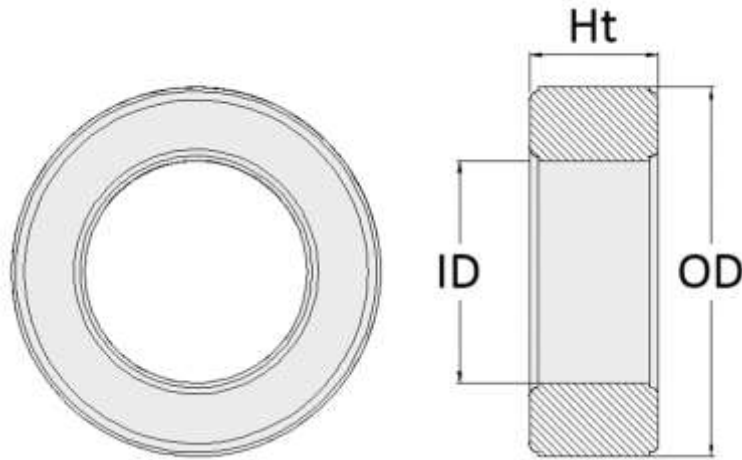
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
11-07-03	532	585	798	1330	1862



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
13-07-05	12.70	0.25	7.14	0.14	4.78	0.10
13-07-06	12.70	0.25	7.14	0.14	6.35	0.13
13-07-08	12.70	0.25	7.14	0.14	7.90	0.16
13-07-10	12.70	0.25	7.14	0.14	9.53	0.19

Catalog #	L _e mm	A _e mm ²	V _e mm ³	W _a mm ²	W _a A _e mm ⁴	Weight Grams
13-07-05	29.50	12.92	381.1	1.27	16.37	2.00
13-07-06	29.50	17.18	506.8	1.27	21.76	2.66
13-07-08	29.50	21.37	630.5	1.27	27.07	3.31
13-07-10	29.50	25.77	760.3	1.27	32.65	3.99

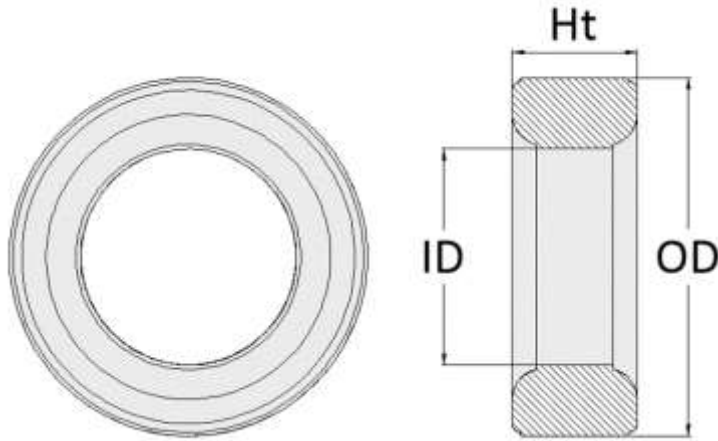
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
13-07-05	1101	1211	1651	2752	3852
13-07-06	1464	1610	2196	3659	5123
13-07-08	1821	2003	2731	4552	6373
13-07-10	2196	2415	3293	5489	7684



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
13-08-03	12.70	0.25	7.92	0.16	3.18	0.06
13-08-05	12.70	0.25	7.92	0.16	5.08	0.10
13-08-06	12.70	0.25	7.92	0.16	6.35	0.13

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
13-08-03	31.23	7.44	232.4	1.27	9.43	1.19
13-08-05	31.23	11.91	371.8	1.27	15.08	1.90
13-08-06	31.23	14.88	464.8	1.27	18.85	2.37

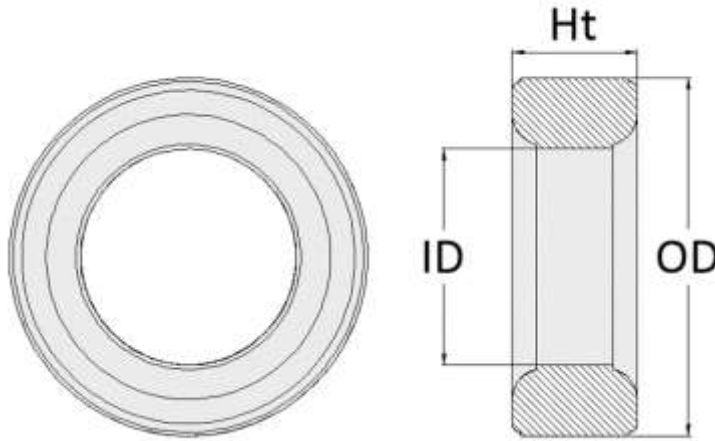
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
13-08-03	599	659	898	1497	2096
13-08-05	958	1054	1437	2396	3354
13-08-06	1198	1318	1797	2995	4193



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
16-09-04	15.88	0.32	9.07	0.18	4.09	0.08
16-09-05	15.88	0.32	9.07	0.18	4.70	0.09
16-09-10	15.88	0.32	9.07	0.18	9.53	0.19

Catalog #	L _e mm	A _e mm ²	V _e mm ³	W _a mm ²	W _a A _e mm ⁴	Weight Grams
16-09-04	37.20	13.56	504.5	1.98	26.84	2.63
16-09-05	37.20	15.58	579.7	1.98	30.84	3.03
16-09-10	37.20	31.59	1175.1	1.98	62.52	6.14

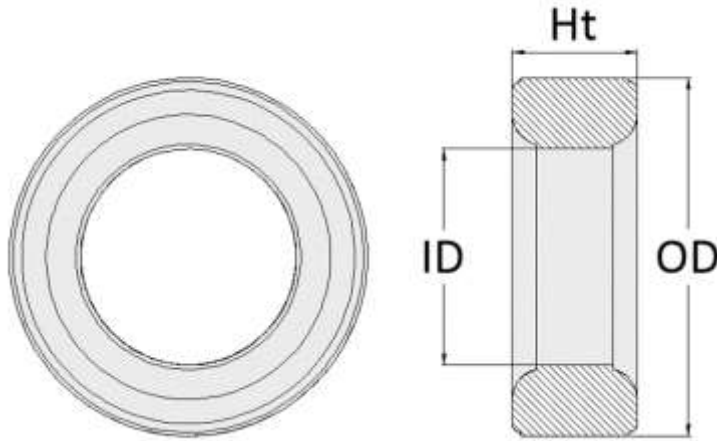
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
16-09-04	916	1008	1374	2290	3206
16-09-05	1053	1158	1579	2632	3684
16-09-10	2134	2347	3200	5334	7468



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
22-14-06	22.10	0.44	13.72	0.27	6.35	0.13
22-14-07	22.10	0.44	13.72	0.27	6.99	0.14
22-14-08	22.10	0.44	13.72	0.27	7.92	0.16
22-14-10	22.10	0.44	13.72	0.27	9.53	0.19

Catalog #	L _e mm	A _e mm ²	V _e mm ³	W _a mm ²	W _a A _e mm ⁴	Weight Grams
22-14-06	54.18	26.11	1415	3.84	100.2	7.23
22-14-07	54.18	28.73	1556	3.84	110.2	7.95
22-14-08	54.18	32.59	1766	3.84	125.0	9.02
22-14-10	54.18	39.17	2122	3.84	150.2	10.85

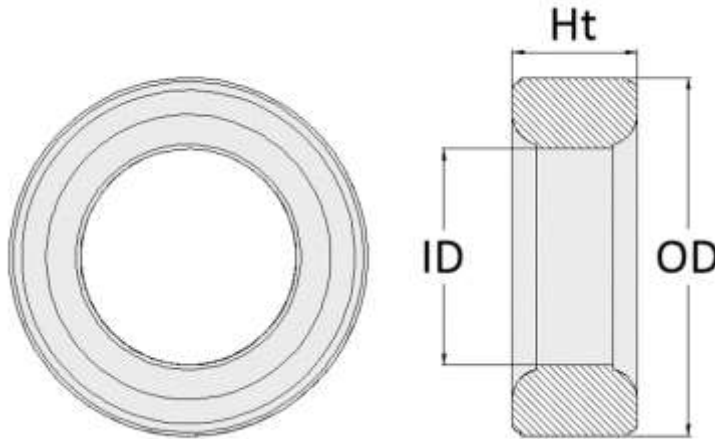
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
22-14-06	1211	1333	1817	3028	4240
22-14-07	1333	1466	1999	3331	4664
22-14-08	1512	1663	2268	3780	5291
22-14-10	1817	1999	2726	4543	6360



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
25-16-08	25.40	0.51	15.49	0.31	7.92	0.16
25-16-16	25.40	0.51	15.49	0.31	15.85	0.32

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
25-16-08	61.69	38.46	2373	5.07	194.9	12.18
25-16-16	61.69	76.92	4746	5.07	389.8	24.36

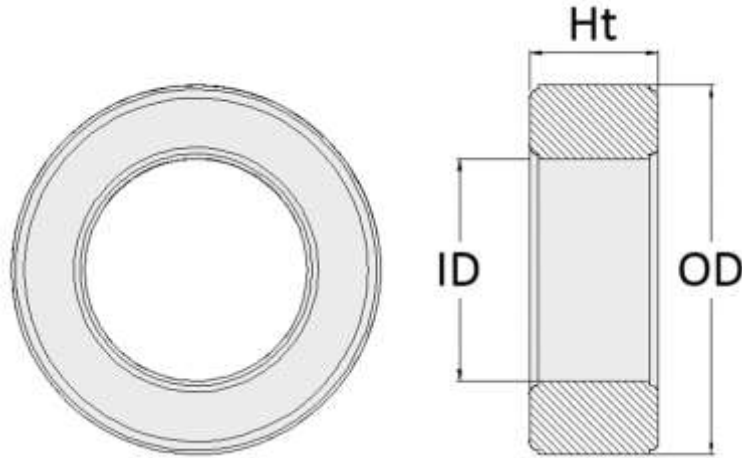
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
25-16-08	1567	1724	2350	3917	5484
25-16-16	3134	3447	4701	7834	10968



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
26-15-04	26.04	0.52	15.24	0.30	3.99	0.08
26-15-12	26.04	0.52	15.24	0.30	12.07	0.24
26-15-16	26.04	0.52	15.24	0.30	15.88	0.32

Catalog #	L _e mm	A _e mm ²	V _e mm ³	W _a mm ²	W _a A _e mm ⁴	Weight Grams
26-15-04	61.84	21.02	1300	5.32	111.9	6.74
26-15-12	61.84	63.59	3932	5.32	338.5	20.39
26-15-16	61.84	83.67	5174	5.32	445.4	26.83

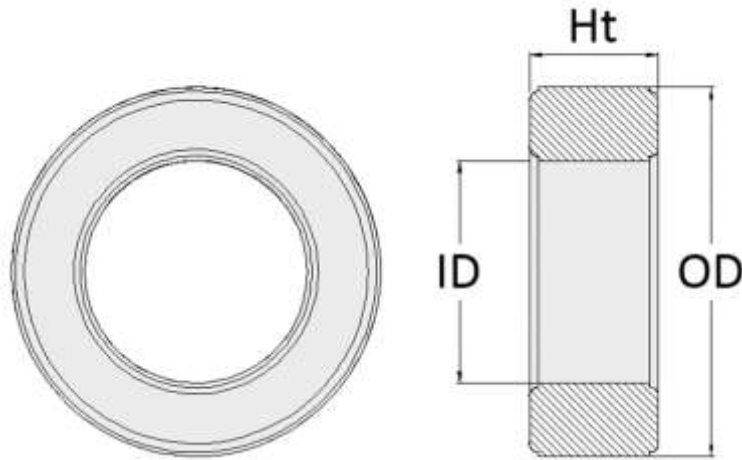
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
26-15-04	854	940	1281	2136	2990
26-15-12	2584	2843	3877	6461	9045
26-15-16	3401	3741	5101	8501	11902



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
28-18-12	27.61	0.55	17.60	0.35	12.19	0.24
28-18-20	27.61	0.55	17.60	0.35	19.99	0.40

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
28-18-12	68.68	59.99	4120	5.99	359.1	20.93
28-18-20	68.68	98.35	6754	5.99	588.8	34.31

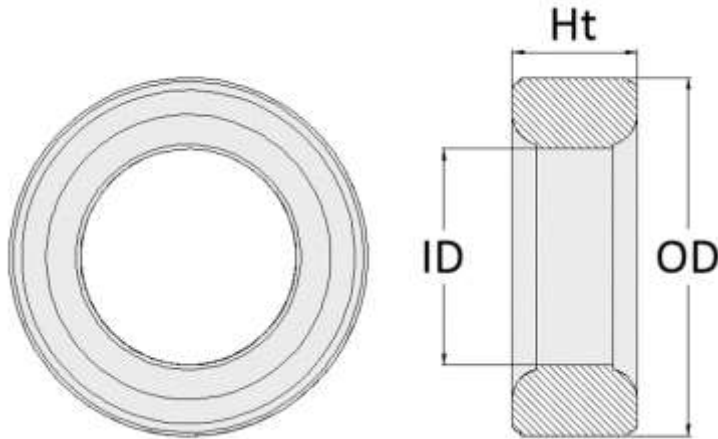
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
28-18-12	2195	2415	3293	5488	7683
28-18-20	3599	3959	5399	8998	12598



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
29-19-08	29.01	0.58	19.00	0.38	7.62	0.15
29-19-13	29.01	0.58	19.00	0.38	12.70	0.25

Catalog #	Le	Ae	Ve	Wa	WaAe	Weight
	mm	mm ²	mm ³	mm ²	mm ⁴	Grams
29-19-08	73.20	37.57	2750	6.61	248.2	13.89
29-19-13	73.20	62.61	4583	6.61	413.7	23.15

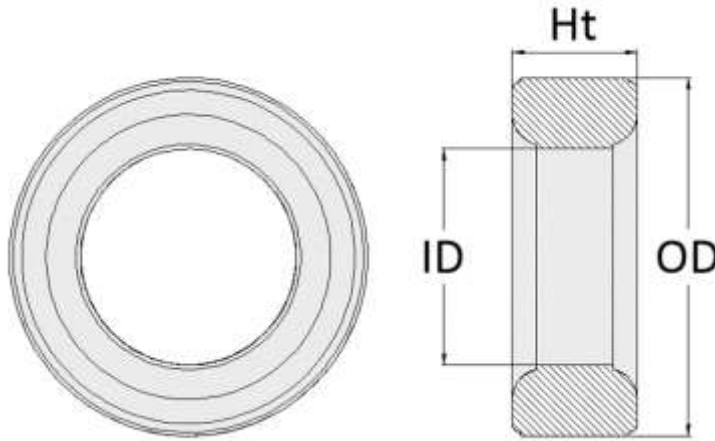
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
29-19-08	1290	1419	1935	3224	4514
29-19-13	2150	2364	3224	5374	7523



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
32-19-11	31.50	0.63	19.00	0.38	11.05	0.22
32-19-12	31.50	0.63	19.00	0.38	12.50	0.25
32-19-06	31.75	0.64	19.00	0.38	6.35	0.13

Catalog #	L _e mm	A _e mm ²	V _e mm ³	W _a mm ²	W _a A _e mm ⁴	Weight Grams
32-19-11	76.04	67.59	5139	7.79	526.6	26.45
32-19-12	76.04	76.44	5813	7.79	595.6	29.91
32-19-06	76.32	39.61	3023	7.92	313.6	15.59

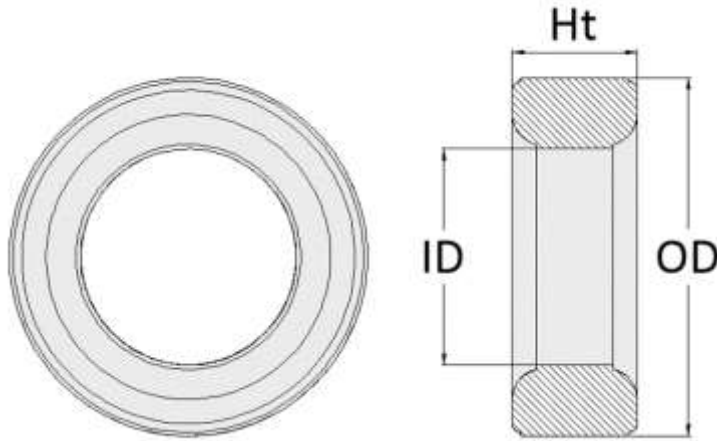
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
32-19-11	2234	2457	3351	5585	7819
32-19-12	2527	2779	3790	6317	8843
32-19-06	1304	1435	1956	3261	4565



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
36-23-09	36.37	0.73	22.61	0.45	9.78	0.20
36-23-10	36.37	0.73	22.61	0.45	10.01	0.20
36-23-15	36.37	0.73	22.61	0.45	15.37	0.31
36-23-19	36.37	0.73	22.61	0.45	19.00	0.38
36-23-29	36.37	0.73	22.61	0.45	29.21	0.58

Catalog #	L _e	A _e	V _e	W _a	W _a A _e	Weight
	mm	mm ²	mm ³	mm ²	mm ⁴	Grams
36-23-09	89.24	66.06	5895	10.39	686.4	30.12
36-23-10	89.24	67.60	6033	10.39	702.4	30.82
36-23-15	89.24	103.81	9264	10.39	1078.6	47.33
36-23-19	89.24	128.34	11453	10.39	1333.6	58.52
36-23-29	89.24	197.32	17609	10.39	2050.2	89.97

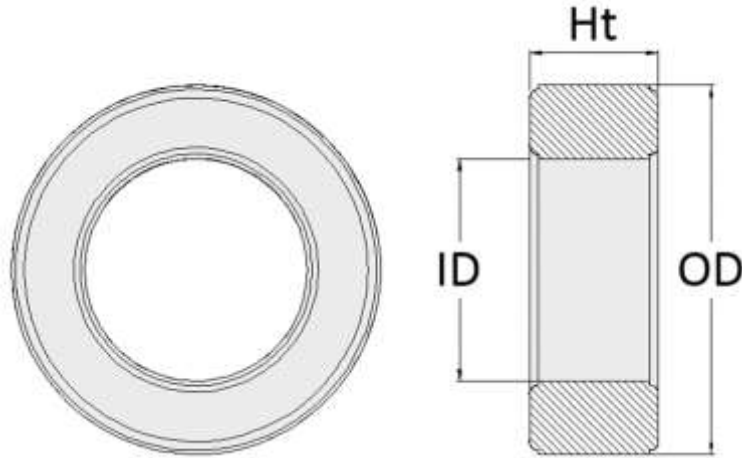
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
36-23-09	1860	2046	2791	4651	6511
36-23-10	1904	2094	2856	4760	6664
36-23-15	2923	3216	4385	7309	10232
36-23-19	3614	3976	5422	9036	12651
36-23-29	5557	6113	8335	13892	19449



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
38-19-06	38.10	0.76	19.05	0.38	6.35	0.13
38-19-25	38.10	0.76	19.05	0.38	25.40	0.51

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
38-19-06	82.97	58.12	4822	11.40	662.6	26.23
38-19-25	82.97	232.48	19288	11.40	2650	104.90

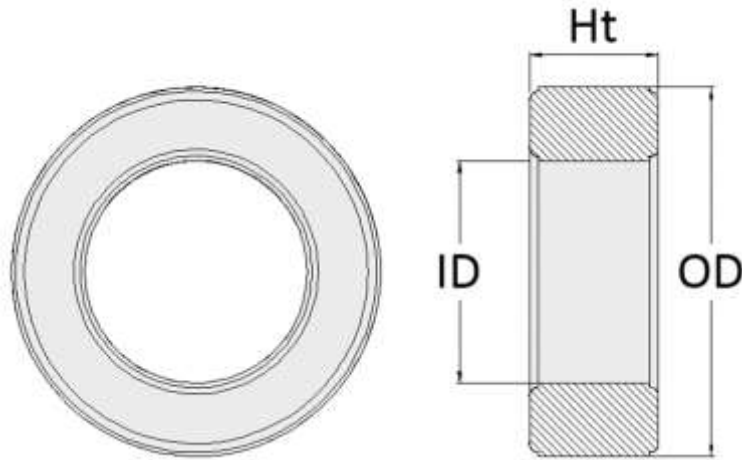
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
38-19-06	1761	1937	2641	4401	6162
38-19-25	7042	7747	10564	17606	24648



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
40-24-16	39.98	0.80	23.98	0.48	15.98	0.32

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
40-24-16	96.22	125.08	12035	12.55	1570	62.03

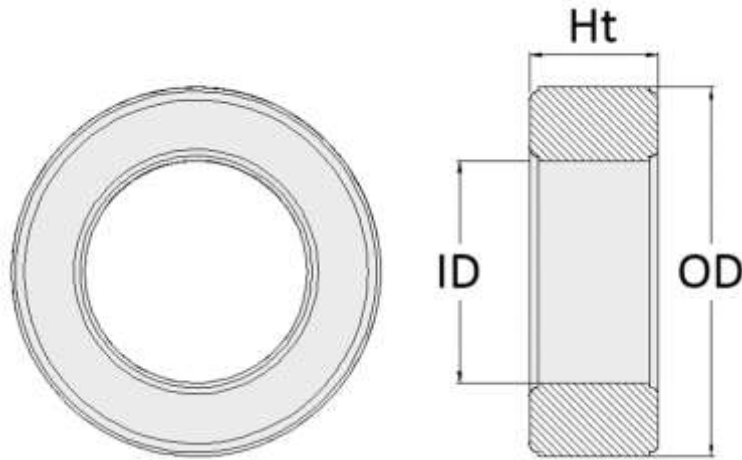
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
40-24-16	3267	3594	4901	8168	11435



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
49-34-16	49.07	0.98	33.83	0.68	15.88	0.32
49-34-22	49.07	0.98	33.83	0.68	21.29	0.43

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
49-34-16	127.27	119.58	15220	18.91	2262	76.09
49-34-22	127.27	160.34	20407	18.91	3033	102.02

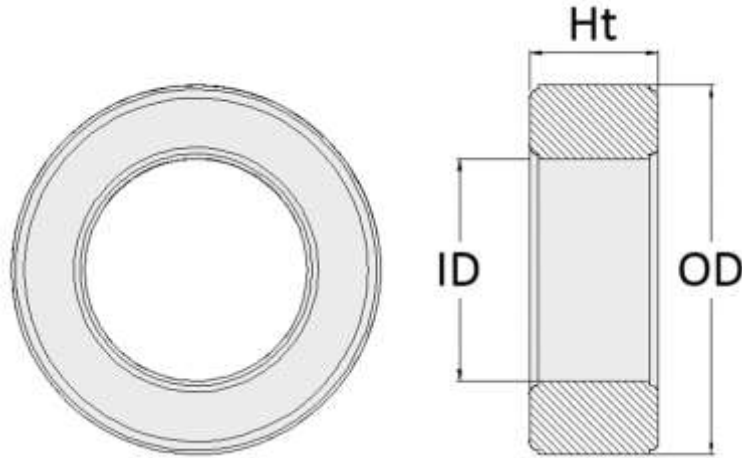
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
49-34-16	2361	2598	3542	5904	8265
49-34-22	3166	3483	4749	7915	11082



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
51-32-06	50.80	1.02	31.75	0.64	6.50	0.13
51-32-12	50.80	1.02	31.75	0.64	12.70	0.25
51-32-16	50.80	1.02	31.75	0.64	15.75	0.31
51-32-19	50.80	1.02	31.75	0.64	19.05	0.38
51-32-31	50.80	1.02	31.75	0.64	31.50	0.63

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
51-32-06	125.02	60.81	7602	20.27	1232	38.79
51-32-12	125.02	118.77	14847	20.27	2407	75.76
51-32-16	125.02	147.27	18411	20.27	2985	93.95
51-32-19	125.02	178.15	22271	20.27	3611	113.64
51-32-31	125.02	294.54	36822	20.27	5970	187.89

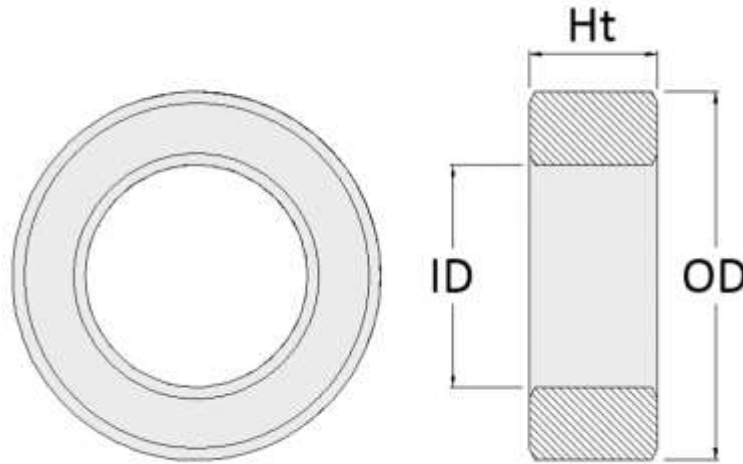
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
51-32-06	1222	1345	1834	3056	4279
51-32-12	2388	2626	3581	5969	8357
51-32-16	2961	3257	4441	7402	10362
51-32-19	3581	3940	5372	8954	12535
51-32-31	5921	6513	8882	14803	20725



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
63-38-25	62.99	1.26	38.00	0.76	24.99	0.50

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
63-38-25	152.08	305.77	46501	31.16	9529	239.32

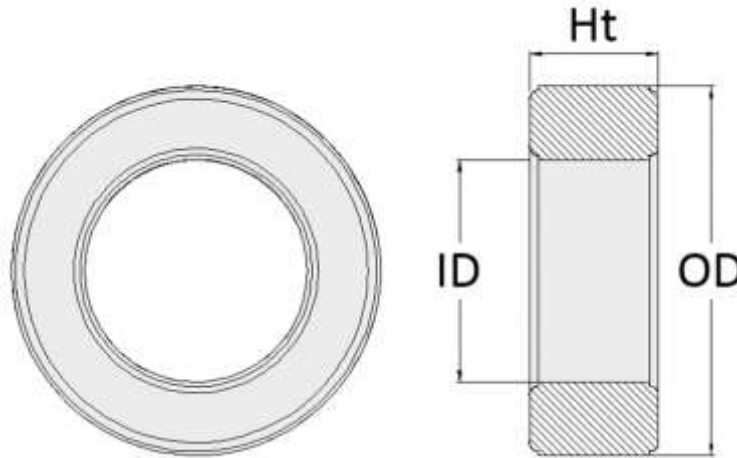
Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
63-38-25	5053	5559	7580	12633	17687



Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
75-23-20	75.01	1.50	23.01	0.46	19.99	0.40

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
75-23-20	123.23	463.21	57080	44.19	20468	386.46

Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
75-23-20	9447	10392	14171	23619	33066

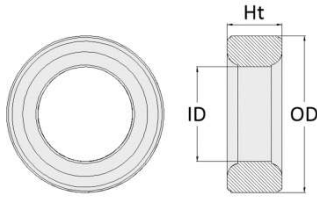


Catalog #	Dimensions [mm]					
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.
80-40-07	80.00	1.60	40.00	0.80	7.00	0.30
80-40-15	80.00	1.60	40.00	0.80	15.00	0.30

Catalog #	L_e mm	A_e mm ²	V_e mm ³	W_a mm ²	$W_a A_e$ mm ⁴	Weight Grams
80-40-07	174.23	134.65	23459	50.28	6770	127.59
80-40-15	174.23	288.53	50270	50.28	14507	273.41

Catalog #	AL value +/- 25%				
	5099 7099 N001	7070	8040 50ALL	5kHF 5000	7000
80-40-07	1942	2137	2913	4856	6798
80-40-15	4162	4578	6243	10405	14567

The various tooling for the listed parts was acquired from purchasing the assets of 3 other Ferrite Companies. It may require modifications or repairs in order to be used.



The figure does not represent the edge on these cores.

Custom Sizes can be made as well.

Catalog #	Dimensions [mm]						L _e mm	A _e mm ²	V _e mm ³	Wa mm ²	WaA _e mm ⁴	Weight Grams
	OD	+/- tol.	ID	+/- tol.	Ht	+/- tol.						
06-04-02	6.30	0.13	3.81	0.08	2.49	0.05	15.23	3.03	46.2	0.31	0.95	0.24
10-06-04	10.01	0.20	5.99	0.12	3.99	0.08	24.07	7.83	188.4	0.79	6.16	0.97
10-06-02	10.01	0.20	5.99	0.12	3.00	0.06	24.07	5.88	141.6	0.79	4.63	0.73
10-06-03	10.24	0.20	5.99	0.12	7.85	0.16	14.43	25.85	372.9	0.82	21.27	2.94
13-07-07	12.95	0.26	7.37	0.15	7.11	0.14	30.28	19.35	586.0	1.32	25.50	3.06
13-07-09	12.95	0.26	7.37	0.15	9.27	0.19	30.28	25.23	764.0	1.32	33.25	3.99
13-09-05	12.95	0.26	8.99	0.18	5.00	0.10	33.72	9.80	330.6	1.32	12.92	1.65
13-09-09	12.95	0.26	8.99	0.18	8.99	0.18	33.72	17.62	594.0	1.32	23.22	2.97
13-07-03	13.36	0.27	7.29	0.15	3.20	0.06	30.53	9.42	287.7	1.40	13.21	1.52
13-07-04	13.36	0.27	7.29	0.15	5.00	0.10	30.53	14.73	449.8	1.40	20.65	2.38
19-11-15	19.00	0.38	11.40	0.23	15.01	0.30	45.75	55.78	2552	2.84	158.14	13.15
19-11-09	19.00	0.38	11.40	0.23	8.00	0.16	45.75	29.73	1360	2.84	84.29	7.01
21-10-10	19.99	0.40	10.01	0.20	10.01	0.20	43.56	48.00	2091	3.14	150.7	11.37
21-10-07	19.99	0.40	10.01	0.20	6.96	0.14	43.56	33.38	1454	3.14	104.8	7.91
21-10-08	19.99	0.40	10.01	0.20	8.00	0.16	43.56	38.38	1672	3.14	120.4	9.09
21-10-15	19.99	0.40	10.01	0.20	15.01	0.30	43.56	72.00	3137	3.14	226.0	17.05
25-15-10	24.99	0.50	15.01	0.30	10.01	0.20	60.20	48.88	2943	4.91	239.8	15.16
25-15-15	24.99	0.50	15.01	0.30	15.01	0.30	60.20	73.32	4414	4.91	359.7	22.74
26-14-10	26.01	0.52	14.15	0.28	10.01	0.20	59.34	57.55	3415	5.31	305.8	18.08
26-15-15	26.01	0.52	14.50	0.29	14.96	0.30	60.16	83.66	5033	5.31	444.5	26.46
26-15-20	26.01	0.52	14.50	0.29	19.99	0.40	60.16	111.79	6725	5.31	594.0	35.35
30-08-13	30.10	0.60	10.69	0.21	20.35	0.41	53.92	180.69	9744	7.12	1285.7	61.10
67-15-20	67.01	1.34	15.01	0.30	19.99	0.40	90.92	432.71	39341	35.26	15258	323.37
100-55-20	100.00	2.00	54.99	1.10	19.99	0.40	229.53	436.69	100234	78.54	34297	528.99
100-67-20	100.00	2.00	67.01	1.34	19.99	0.40	255.45	325.41	83125	78.54	25557	417.85
152-69-19	151.99	3.04	68.50	1.37	19.00	0.38	312.24	752.44	234942	181.44	136525	1326.81
152-69-18	151.99	3.04	68.50	1.37	18.49	0.37	312.24	732.32	228660	181.44	132875	1291.34
152-104-19	151.99	3.04	103.99	2.08	19.00	0.38	392.60	450.60	176906	181.44	81759	885.68

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History

Ferrite International was established 1985 as a division of Tempel Steel Company and was purchased in 1990 by Tempel Smith.

Quality Policy

To provide the highest value magnetic materials to our customers through a combination of exceptional quality, price, delivery and service.

Ferrite International is compliant to ISO 9000 1994.

International Environmental Regulatory Compliance

RoHS * REACH * ELV * WEEE * Halogen Free

Social Accountability Compliance

US Family and Medical Leave Act

US Environmental Protection Agency

US Clean Air Act

US National Primary Drinking Water Regulation

US Fair Labor Standards Act

US Occupational Safety and Health Administration

US Equal Employment Opportunity Commission

US Conflict Free Minerals

Warranty / Disclaimer

"TSC International" expressly warrants to the "Buyer" for whom it manufactures, sells and delivers product made of magnetic materials will conform to specifications and drawings as published within the product catalog. Buyer specifications that have not been approved by the International Electronic Commission shall be considered as a custom product, and will be warranted by TSC International in a separate written agreement.

There are no other express or implied warranties which extend beyond the above-referenced warranty of conformance to the specifications and specifically. TSC International does not warrant that any product will be merchantable or fit for the particular purpose for which the purchaser, its successors, agents or affiliates, intends to use product. Before using these products, buyer agrees to determine suitability of the product for their intended use or application.

Buyer shall notify TSC International in writing (and reasonable detail) of any defect in any product within thirty (30) days after the delivery date thereof. If products do not conform to the specification and TSC determines to its satisfaction that the parts are defective, and the defect is not due to miss-use, accident or improper application, buyer's remedy shall be limited, at TSC international's sole discretion, to either (1) The return of such product in exchange for the return of, or credit for any payment received by TSC International relating thereto; (2) The replacement of such product; or (3) The repair of such product. TSC International shall pay reasonable shipping costs incurred in connection with the return, replacement or repair of any defective product. Solution to resolve defective product shall be within (60) days after written receipt of written notice from the buyer of such defect.

TSC International shall not be liable for any incidental or consequential loss, damage, or expense (including without limitation, economic loss or lost profits) of buyer for any defective product sold and delivered to the buyer regardless of whether such loss, damage or expense results from breach of contract or warranty or commission of tort (including, without limitation, strict liability or negligence).

These products are not designed for use in life support appliances, devices or systems where malfunction of these products can reasonably be expected to result in personal injury, Buyers that are using or selling these products for use in such applications do so at their own risk and agree to indemnify TSC International for any damages resulting from such application.

TSC International reserves the right to make changes without notice in order to improve design and supply the best possible product.