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Amorphous and nanocrystalline cores

The first application which has been discussed for the newly developed metallic glasses based on FeSiB have been 60 Hz distribution transformers. The first commercial cores however were pretty tiny toroids from an amorphous Co-based alloy called VITROVAC. They have been and are used as saturable reactors for the output voltage regulation in SMPS.

More standard series of cores and c-cores from Fe-based and Co-based alloys for transformers and chokes followed. Later amorphous cores have been supplemented (and to some extent replaced) by nanocrystalline cores, which combine the best sides of amorphous Co-based and Fe-based alloys w/o the expensive Co.

The following pages summarize general information about the nanocrystalline and amorphous standard core series from Vacuumschmelze GmbH & Co. KG (**VITROPERM[®]** (VP) and **VITROVAC[®]** (VC).) Please mind possible changes and double-check features and availability with us.

Please note: The “Magnetic Qualities” are based on specific applications for which the cores have been designed for. Other applications are possible, however please ensure that the specified limiting values are in accordance with your requirements..

Sekels GmbH as official distributor of Vacuumschmelze GmbH & Co. KG offers most standard cores ex stock. We know the products and applications since more than 30 years and are available for technical questions or discussions.

What are tape-wound toroidal cores?

These cores are not pressed or sintered, but wound from thin metallic (soft magnetic) foils to toroids. This is the most economic process to get a core from a metallic foil. The cores are “annealed” after winding, and coated or placed in a plastic box for mechanical and electrical protection. Please mind the total size, and mechanical tolerances of coated cores.

Where are the high permeability NiFe cores (e. g. ULTRAPERM® 250)?

Mostly gone and replaced by nanocrystalline cores. At least the small and high grade cores, e. g. for the European type of passive RCCD. If you have found one of the special grades “from the books” suitable for your application please give us a call for a technical discussion.

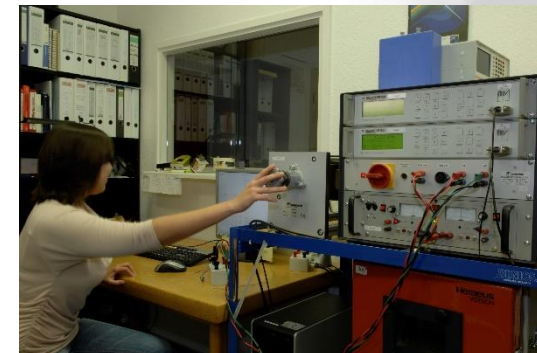
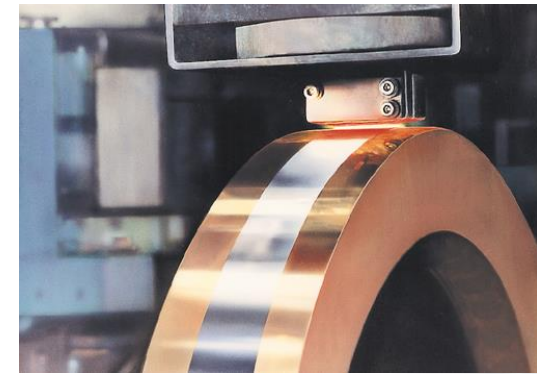
What if I need cores „in between“ or smaller/bigger than the standard?

Could be a challenge as the big cores producers are pretty reluctant to start something different from the standard range. There are however a few options depending on the requirements. Please give us a call.

Amorphous ribbon (also nanocrystalline cores start with amorphous ribbon) is produced via a special rapid solidification technology. In order to freeze-in the amorphous “structure” of the melt, cooling rates of 1 million degrees per second are necessary, which is fairly fast. The most common technology is the so-called melt-spinning technology, where the hot melt is pressed via a ceramic nozzle on a fast rotating and water cooled copper wheel. The melt almost immediately solidifies to the solid state, and after a certain contact time and contact length a thin metallic and amorphous strip is produced from the melt in only 1 step - with a velocity of about 100 km per hour.

What we have now is a thin metallic strip, fairly brittle, very hard with potentially superior soft magnetic properties - after magnetic annealing. During the annealing (and crystallization in case of nanocrystalline cores) process the strip further embrittles, which means we need to produce a magnetic core before annealing.

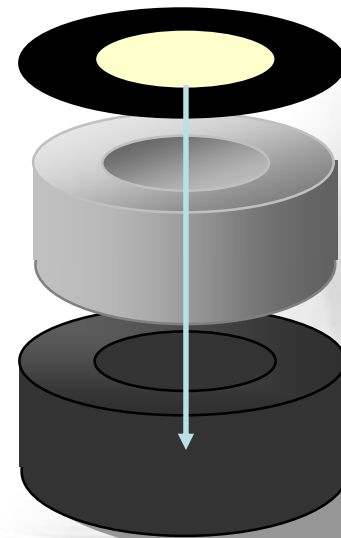
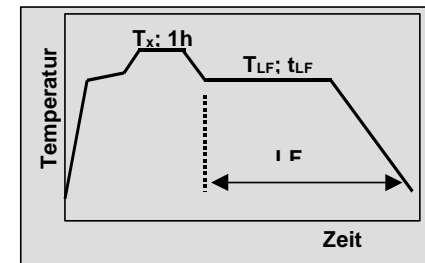
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The core production is again a very straight forward process. However a fully controlled, fast and automated core production with a brittle non-uniform thin strip that has sharp edges requires a few engineering skills - particularly if you want to do this fast and very cost effective without the need for a manual process in a low cost country. Even today Vacuumschmelze is still continuing to optimize the equipment - after more than three decades of production of amorphous and nanocrystalline cores in the millions. The results are high quality cores that are very uniform in their properties, from batch to batch, in summer as well as in winter.

The possible core shapes are certainly limited, and all what is different from a simple tape-wound toroid is relatively complex to manufacture and consequently more expensive. But remember: toroids have the most uniform flux distribution of all possible core shapes, which is a precondition to make use of the full magnetic potential of the material.

The wound cores still have to be annealed to optimize and “shape” the magnetic properties. After this they are electrically and mechanically protected by either a plastic protection box or epoxy coating.



Standard series VP 500F for CMC “boxed” (1)



Standard cores with high and medium permeability. Magnetic specification see data sheets.

VAC product (part number)	Nominal core size	Maximum cores size (incl. protection box)			Nominal cross section	Nominal magnetic path	Weight	A _L		Max. unbalanced current I _{cm} **		Permeability
	d _a x d _i x h	D _a	D _i	H	A _{Fe}	l _{Fe}	m _{Fe}	10 kHz nominal	100 kHz nominal	10 kHz nominal	100kHz nominal	10 kHz nominal
	mm x mm x mm	mm	mm	mm	cm ²	cm	g	μH	μH	A	A	μ
T60006-L2009-W914	9,8 x 6,5 x 4,5	11,2	5,1	5,8	0,06	2,6	1,1	25,5	6,4	0,2	0,4	87933
T60006-L2012-W902	12 x 8 x 4,5	14,1	6,6	6,3	0,07	3,1	1,7	28,0	6,8	0,2	0,4	98676
T60006-L2014-V098	14,4 x 11,4 x 3,2	16,5	9,6	5,0	0,04	4,1	1,1	10,5	2,6	0,2	0,4	85645
T60006-L2015-W865	15 x 10 x 4,5	17,1	7,9	6,5	0,09	3,9	2,6	27,0	6,7	0,3	0,5	93106
T60006-L2016-W403	16 x 10 x 6	17,9	8,1	8,1	0,14	4,1	4	43,0	10,1	0,3	0,6	100211
T60006-L2017-W515	17,5 x 12,6 x 6	19,0	11,0	8,0	0,12	4,7	4,1	30,0	6,9	0,3	0,7	93504
T60006-L2019-W838	19 x 15 x 10	21,2	13,0	12,3	0,16	5,3	6,3	36,1	8,8	0,4	0,7	95160
T60006-L2019-V184	19 x 15 x 5	21,2	13,0	7,3	0,08	5,3	3,1	18,0	4,4	0,4	0,7	94896
T60006-L2020-W409	20 x 12,5 x 8	22,6	10,3	10,2	0,24	5,1	9,0	55,2	13,6	0,4	0,7	93344
T60006-L2025-W523	25 x 20 x 10	27,6	17,4	12,8	0,2	7,1	10,4	28,4	7,3	0,6	1,1	80230
T60006-L2025-W380	25 x 16 x 10	27,9	13,6	12,5	0,36	6,4	17	65,5	15,5	0,4	0,9	92664
T60006-L2030-W514	30 x 20 x 15	32,8	17,5	17,8	0,57	7,9	33	88,0	20,0	0,5	1,1	97057
T60006-L2030-W423	30 x 20 x 10	32,8	17,6	12,5	0,4	7,9	23	59,3	14,0	0,5	1,0	93199
T60006-L2040-W424	40 x 25 x 15	43,1	22,5	18,5	0,86	10,2	64	101,0	23,1	0,7	1,4	95326
T60006-L2040-W422	40 x 32 x 15	43,1	28,7	18,5	0,46	11,3	38	47,2	11,1	0,8	1,5	92268
T60006-L2045-V102	45 x 30 x 15	48,3	26,4	18,2	0,86	11,8	74	87,5	20,3	0,8	1,6	95339
T60006-L2054-V172	54 x 40 x 20	57,5	37,7	24,1	1,06	14,8	115	87,0	19,9	0,7	1,4	96664
T60006-L2012-W498	12,5 x 10 x 5	14,3	8,5	7,0	0,05	3,5	1,3	10,0	3,6	0,4	0,8	55704
T60006-L2050-W516	50 x 40 x 20	53,5	36,3	23,4	0,76	14,1	79	45,3	14,0	1,4	2,7	66880
T60006-L2063-W517	63 x 50 x 25	67,3	46,5	28,6	1,24	17,8	161	58,6	18,1	1,8	3,5	66940
T60006-L2080-V140	80 x 50 x 20	85,8	44,6	25,5	2,28	20,4	342	94,0	28,0	1,4	2,8	66929
T60006-L2090-W518	90 x 60 x 20	95,4	54,7	24,7	2,28	23,6	395	81,0	25,1	2,4	4,5	66719
T60006-L2100-V082	100 x 80 x 25	105,5	75,0	29,6	1,9	28,3	379	56,3	16,9	2,8	5,3	66732
T60006-L2102-W468	102 x 76 x 25	108,1	70,0	30,3	2,47	28,0	508	68,8	21,6	3,8	6,7	62064

Standard series VP 500F for CMC “boxed” (2)



Standard cores with „low“ permeabilities for higher unbalanced currents. Magnetic specification see data sheets.

VAC product (part number)	Nominal core size	Maximum cores size (incl. protection box)			Nominal cross section	Nominal magnetic path	Weight	A _L		Max. unbalanced current I _{cm} **		Perme- ability
		d _a x d _i x h	D _a	D _i				H	A _{Fe}	l _{Fe}	m _{Fe}	
	mm x mm x mm	mm	mm	mm	cm ²	cm	g	μH	μH	A	A	μ
T60006-L2016-W308	16 x 10 x 6	17,9	8,1	8,1	0,14	4,1	4	11,7	6,5	1,2	1,7	27267
T60006-L2020-W450	20 x 12,5 x 8	22,6	10,3	10,2	0,24	5,1	9	14,3	9,1	1,4	2,1	24182
T60006-L2025-W451	25 x 16 x 10	27,9	13,6	12,5	0,36	6,4	17	17,0	11,5	1,7	2,6	24050
T60006-L2030-W358	30 x 20 x 10	32,8	17,6	12,5	0,4	7,9	23	15,5	11,1	2,1	3,1	24361
T60006-L2040-W453	40 x 25 x 15	43,1	22,5	18,5	0,86	10,2	64	25,4	17,2	2,9	4,2	23973
T60006-L2040-V113	40 x 32 x 15	43,1	28,7	18,5	0,46	11,3	38	13,0	8,4	2,9	4,5	25413
T60006-L2045-V118	45 x 30 x 15	48,3	26,4	18,2	0,86	11,8	74	24,3	15,9	3,0	4,5	26533
T60006-L2050-W565	50 x 40 x 20	53,5	36,3	23,4	0,76	14,1	79	18,0	10,0	3,5	5,3	26575
T60006-L2054-V178	54 x 40 x 20	57,5	37,7	24,1	1,06	14,8	115	24,0	15,7	3,7	5,7	26666
T60006-L2063-V110	63 x 50 x 25	67,3	46,5	28,6	1,24	17,8	161	23,3	13,5	4,4	6,7	26616
T60006-L2080-W531	80 x 50 x 20	86,0	44,7	25,7	2,28	20,4	342	35,0	24,0	5,5	8,2	24920
T60006-L2090-V173	90 x 60 x 20	95,4	54,7	24,7	2,28	23,6	400	32,5	21,1	5,8	9,0	26770
T60006-L2160-V074	160 x 130 x 25	166,9	123,9	30,5	2,74	45,6	917	26,8	13,7	8,4	13,6	35493
T60006-L2160-V088	160 x 130 x 25	166,9	123,9	30,5	2,74	45,6	917	20,1	13,1	11,3	17,1	26620
T60006-L2030-V129	30 x 20 x 15	32,8	17,5	17,8	0,57	7,9	33	15,7	14,1	3,0	3,9	17316
T60006-L2045-V101	45 x 30 x 15	48,3	26,4	18,2	0,86	11,8	74	15,7	14,3	4,6	5,8	17142
T60006-L2050-V146	50 x 40 x 20	53,5	36,3	23,4	0,76	14,1	79	11,7	10,0	5,4	7,0	17274
T60006-L2063-V144	63 x 50 x 25	67,3	46,5	28,6	1,24	17,8	161	15,1	13,5	6,8	8,8	17249
T60006-L2100-V081	100 x 80 x 25	105,5	75,0	29,6	1,9	28,3	379	14,5	13,1	10,9	13,8	17187
T60006-L2102-V080	102 x 76 x 25	108,1	70,0	30,3	2,47	28,0	508	19,1	17,2	10,7	13,6	17230
T60006-L2160-V066	160 x 130 x 25	166,9	123,9	30,5	2,74	45,6	917	12,9	11,7	17,6	22,3	17084

Standard series VP 500F for CMC FIX 350 (VF series)



Standard cores with epoxy coating. Magnetic specification see data sheets.

VAC product (part number)	Nominal core size	Maximum cores size (incl. protection box)			Nominal cross section	Nominal magnetic path	Weight	A_L		Max. unbalanced current I_{cm}^{**}		Permeability
	$d_a \times d_i \times h$	D_a	D_i	H	A_{Fe}	l_{Fe}	m_{Fe}	10 kHz nominal	100 kHz nominal	10 kHz nominal	100kHz nominal	10 kHz nominal
	mm x mm x mm	mm	mm	mm	cm ²	cm	g	μH	μH	A	A	μ
T60004-L2016-W620	16 x 12,5 x 6	17,8	10,7	8,0	0,08	4,5	2,6	15,0	4,8	0,5	0,8	67143
T60004-L2022-W867	22 x 17 x 6	24,0	15,2	8,0	0,12	6,1	5,4	16,4	4,3	0,6	1,2	66341
T60004-L2022-W868	22 x 17 x 10	24,0	15,2	12,0	0,2	6,1	9	27,4	5,3	0,4	0,8	66503
T60004-L2025-W622	25 x 20 x 10	27,3	17,5	12,3	0,19	7,1	9,9	22,5	7,2	0,7	1,4	66908
T60004-L2030-W676	30 x 25 x 15	32,3	22,7	17,5	0,27	8,6	17,4	26,5	8,5	0,9	1,7	67169
T60004-L2030-W911	30 x 20 x 10	32,5	17,8	12,5	0,4	7,9	23,1	56,0	13,4	0,6	1,2	88013
T60004-L2040-W624	40 x 32 x 15	42,3	29,1	17,8	0,44	11,3	36	32,5	10,3	1,1	2,2	66420
T60004-L2050-W626	50 x 40 x 20	52,3	37,1	22,8	0,73	14,1	76	43,0	13,8	1,4	2,7	66093
T60004-L2130-W567	130 x 100 x 25	134,5	95,0	28,5	2,85	36,1	757	50,0	19,4	4,8	8,5	50399
T60004-L2194-V105	194 x 155 x 25	200,0	149,0	28,5	3,71	54,8	1490	45,3	14,7	6,9	12,5	53247
T60004-L2016-W619	16 x 12,5 x 6	17,8	10,7	8,0	0,08	4,5	2,6	6,0	3,9	1,1	1,7	26857
T60004-L2025-W621	25 x 20 x 10	27,3	17,5	12,3	0,19	7,1	9,9	9,0	5,8	1,7	2,7	26763
T60004-L2040-W623	40 x 32 x 15	42,3	29,1	17,8	0,44	11,3	36	13,0	8,4	2,8	4,3	26568
T60004-L2045-W886	45 x 32 x 15	47,3	29,8	17,8	0,71	12,1	63,3	19,7	12,8	3,0	4,6	26717
T60004-L2050-W625	50 x 40 x 20	52,3	37,1	22,8	0,73	14,1	76	17,0	11,2	3,6	5,4	26130
T60004-L2063-W627	63 x 50 x 20	65,5	46,6	22,8	0,95	17,8	124	18,0	11,6	4,4	6,7	26839
T60004-L2080-W628	80 x 63 x 20	83,0	59,5	22,8	1,24	22,5	205	18,5	12,0	5,6	8,5	26713
T60004-L2100-W629	100 x 80 x 20	104,0	75,0	23,0	1,46	28,3	303	17,3	11,2	7,1	10,7	26626
T60004-L2130-W630	130 x 100 x 25	134,5	95,0	28,5	2,74	36,1	727	25,4	16,5	9,0	13,6	26631
T60004-L2160-W631	160 x 130 x 25	165,0	125,0	28,5	2,74	45,6	917	20,1	13,1	11,3	17,1	26620
T60004-L2050-W583	50 x 40 x 20	52,3	37,1	22,8	0,73	14,1	76	11,2	10,0	5,4	7,0	17215
T60004-L2063-W721	63 x 50 x 20	65,5	46,6	22,8	0,95	17,8	124	11,5	10,4	6,9	8,7	17147
T60004-L2080-W722	80 x 63 x 20	83,0	59,5	22,8	1,24	22,5	205	11,9	10,7	8,7	11,0	17183
T60004-L2100-W723	100 x 80 x 20	104,0	75,0	23,0	1,46	28,3	303	11,2	10,0	10,9	13,8	17276
T60004-L2130-W587	130 x 100 x 25	134,5	95,0	28,5	2,74	36,1	727	16,4	14,7	14,0	17,7	17195
T60004-L2160-W720	160 x 130 x 25	165,0	125,0	28,5	2,74	45,6	917	13,0	11,7	17,6	22,3	17217
T60004-L2194-W908	194 x 155 x 25	200,0	149,0	28,5	3,71	54,8	1490	14,7	13,2	20,7	26,4	17279

VP 250F is a specific composition with low permeability for high unbalanced currents. The alloy has a slightly higher magnetostriction than standard VITROPERM composition, therefore the cores are boxed. Magnetic specification see data sheets.

VAC product (part number)	Nominal core size	Max. core size (incl. coating)			Nominal cross section	Nominal magnetic path	Weight	A_L	Max. unbalanced current I_{cm}^{**}	μ
	$d_a \times d_i \times h$	D_a	D_i	H	A_{Fe}	l_{Fe}		100 kHz nominal	100 kHz nominal	100 kHz nominal
	mm x mm x mm	mm	mm	mm	cm ²	cm	g	μH	{A}	
T60006-L2016-V165	16 x 10 x 6	17,9	8,1	8,1	0,14	4,08	4,4	2	5,6	4638
T60006-L2025-W980	25 x 16 x 10	27,9	13,6	12,5	0,36	6,44	17,3	3,1	9,6	4413
T60006-L2030-W981	30 x 20 x 10	32,8	17,6	12,5	0,4	7,85	23,4	2,8	11,8	4373
T60006-L2040-W964	40 x 32 x 15	43,3	28,8	18,3	0,46	11,3	38,4	2,2	17,1	4301
T60006-L2050-V166	50 x 40 x 20	53,5	36,3	23,4	0,76	14,1	80	3	20,5	4429
T60006-L2063-W985	63 x 50 x 25	67,3	46,5	28,6	1,24	17,8	163	3,3	30,9	3770
T60006-L2080-V091	80 x 50 x 20	85,8	44,6	25,5	2,28	20,4	347	9,2	27,3	6550
T60006-L2090-W984	90 x 60 x 20	95,4	56,1	24,7	2,28	23,6	400	4,5	41,8	3707
T60006-L2102-W947	102 x 76 x 25	108,1	70	30,3	2,47	28	515	4,2	48,5	3789
T60006-L2160-W982	160 x 130 x 25	166,7	124,1	30,6	2,85	45,6	967	2,85	81,1	3629

The nanocrystalline VITROPERM cores (W836, W835, W975) are suitable for high precision current transformers w/o „dc requirements“. Current transformers with the amorphous VITROVAC cores fulfil the „dc“ requirements for electronic energy meters in household applications (if properly designed). Both variants feature an excellent frequency response and are suitable for current transformers with high demands. Magnetic specification please see data sheets.

VAC product (part number)	Current range	DC tolerance	Max. size incl. Coating (epoxy)			Nominal cross section	Nominal magnetic path	Weight	μ_4 (μ_1^*)
	I_{eff}	\hat{I}	D_a	D_i	Höhe	A_{Fe}	l_{Fe}	m_{Fe}	
	A_{rms}	A_{Op}	mm	mm	mm	cm ²	cm	g	50 Hz / 4 (1) mA/cm
T60004-L2022-W836	60	-	23,8	15,8	7,8	0.12	6,22	5,67	> 80.000
T60004-L2025-W835	100	-	26,5	18,6	7,8	0.124	7,07	6,4	> 80.000
T60004-L2019-W979	20	-	20,5	13,6	7,8	0.1	5,34	3,9	> 80.000
T60004-E3019-W592	20	20	20,5	13,8	7,8	0.104	5,34	4,3	2550 – 3450*
T60004-E3019-W800	40	40	20,9	14,1	9,6	0.148	5,5	6,4	1600 – 1900*
T60004-E3022-W639	60	60	23,4	15,8	8,1	0.11	6,13	5,2	1600 – 1900*
T60004-E3025-W588	100	100	26,5	18,8	7,8	0.13	7,07	7,3	1300 – 1600*
T60004-E3031-W774	120	120	32,8	24,5	8	0.13	8,95	9,2	1300 – 1600'

VP 500F cores for power transformers are epoxy coated for a better heat transfer. Typical application frequencies range from about 10 kHz to about 200 kHz. Magnetic specification please see data sheets.

VAC product (part number)	Nominal core size	Max. core size (incl. coating)			Nominal cross section	Nominal magnetic path	Weight	A_L	Effective winding area	Mean nominal C_U path length	Nominal heat transfer coefficient
	$d_a \times d_i \times h$	D_a	D_i	H	A_{Fe}	l_{Fe}	m_{Fe}	10 kHz nominal	A_{Cu}	l_{Cu}	R_{th}
	mm x mm x mm	mm	mm	mm	cm ²	cm	g	μH	cm ²	cm	K / W
T60004-L2016-W373	16 x 10 x 6	17,6	8,3	8	0,14	4,08	4,3	10	0,2	3,18	33
T60004-L2020-W374	20 x 12,5 x 8	22	10,5	10	0,24	5,11	9	13	0,32	3,97	23
T60004-L2025-W375	25 x 16 x 10	27	14	12	0,36	6,44	17	16	0,58	4,80	16
T60004-L2030-W376	30 x 20 x 15	32,3	17,8	17,8	0,57	7,85	33	20	0,93	6,41	11
T60004-L2040-W433	40 x 25 x 15	42,3	22,5	17,3	0,86	10,2	64	23	0,49	7,21	7,5
T60004-L2050-W434	50 x 40 x 20	52,3	37,1	22,8	0,76	14,1	79	15	4,05	9,00	4,5
T60004-L2052-W827	52 x 40 x 25	54,3	37,1	27,8	1,14	14,5	121	22	4,05	10,20	4,1
T60004-L2055-V045	55 x 40 x 25	57,5	37,1	27,8	1,43	14,9	156	26	4,05	10,50	3,9
T60004-L2063-W435	63 x 50 x 25	65,6	46,6	27,8	1,24	17,8	161	19	6,4	11,10	3,1
T60004-L2080-W436	80 x 63 x 25	83,5	59,3	27,8	1,62	22,5	267	20	10,4	12,60	2,2
T60004-L2100-W342	100 x 80 x 25	104,5	74,5	28,5	1,9	28,3	395	19	16,4	14,60	1,6
T60004-L2130-W352	130 x 100 x 25	135,5	94,5	28,5	2,85	36,1	757	22	26,3	17,20	1,1
T60004-L2160-W758	160 x 110 x 25	165	105	28,5	4,75	42,4	1480	31	32,5	19,90	0,8

Standard series VC 6025Z and VP 500Z cores



„Z“ cores (square hysteresis loop) from VITROPERM or VITROVAC are suitable for MagAmp and Spike Killer applications. Magnetic specification please see data sheets.

VAC product (part number)	Nominal core size	Max. size (incl. fixation)			Nominal cross section	Nominal magnetic path	Weight	Saturation flux density		Effective winding area	Nominal mean Cu plength	W _a x F	Heat transfer coefficient core	Heat transfer coefficient choke
								(25°C)	(90°C)					
		d _a x d _i x h mm x mm x mm	D _a mm	D _i mm	H mm	A _{Fe} cm ²	l _{Fe} cm	m _{Fe} g	μWB	μWB	A _{Cu} cm ²	l _{Cu} cm	Vs * mm ²	R _{th} K / W
Cores from VITROVAC 6025 Z for MagAmp and Spike Killer applications														
T60006-E4010-W534	10 x 8 x 4	11,6	6,5	5,1	0,032	2,83	0,7	3,7	3,2	0,082	2,01	106 * 10-6	99	56
T60006-E4010-W663	10,1 x 6,9 x 4,5	11,6	5,5	6	0,058	2,67	1,2	6,7	5,8	0,059	2,24	138 * 10-6	95	57
T60006-E4010-W728	10,7 x 8,2 x 4,5	14	6,6	6,2	0,045	2,97	1	5,2	4,5	0,085	2,45	154 * 10-6	85	47
T60006-E4012-W464	12,8 x 9,5 x 3,2	14,7	7,9	4,8	0,042	3,5	1,1	4,8	4,2	0,121	2,23	206 * 10-6	79	44
T60006-E4012-W547	12 x 8 x 4,5	14	6,6	6,2	0,072	3,14	1,7	8,1	7	0,085	2,45	246 * 10-6	78	47
T60006-E4012-W535	12,5 x 10 x 5	14	8,5	6,8	0,05	3,53	1,4	5,8	5	0,14	2,56	284 * 10-6	76	42
T60006-E4014-W481	14 x 8 x 4,5	15,5	6,5	5,7	0,108	3,46	2,9	12,4	10,8	0,082	2,53	358 * 10-6	72	44
T60006-E4015-W813	15 x 10 x 4,5	17,1	7,9	6,5	0,09	3,93	2,7	10,4	9	0,121	2,84	441 * 10-6	62	37
T60006-E4016-W536	16 x 10 x 6	17,9	8,2	8,2	0,144	4,08	4,5	16,6	14,4	0,131	3,2	760 * 10-6	57	34
T60006-E4017-W537	17,5 x 12,5 x 6	19,1	10,9	8,1	0,12	4,71	4,4	13,8	12	0,231	3,3	1120 * 10-6	54	30
T60004-E4019-W666	19,2 x 12,7 x 6	20,6	11,4	7,4	0,161	5,01	6,2	18,5	16,1	0,253	3,3	1642 * 10-6	50	28
T60006-E4019-W539	19 x 15 x 5	21,2	13	7,3	0,08	5,34	3,3	9,2	8	0,329	3,17	1062 * 10-6	49	27
T60006-E4019-W540	19 x 15 x 10	21,2	13	12,3	0,16	5,34	6,6	18,4	16	0,329	4,25	2124 * 10-6	43	24
T60006-E4020-W538	20 x 12,5 x 8	22,6	10,3	10,2	0,24	5,1	9,4	27,6	24	0,206	4,05	2000 * 10-6	43	26
T60006-E4025-W542	25 x 20 x 10	27,7	17,1	12,9	0,2	7,1	10,9	23	20	0,568	4,98	4593 * 10-6	33	18
T60006-E4025-W541	25 x 16 x 10	27,9	13,6	12,5	0,36	6,44	17,9	41,4	36	0,36	5	5230 * 10-6	33	19
T60006-E4030-W543	30 x 20 x 10	32,8	17,6	12,5	0,4	7,85	24,2	46	40	0,602	5,4	9731 * 10-6	28	16
T60006-E4040-W544	40 x 25 x 15	43,1	22,4	18,5	0,9	10,2	70,8	103,5	90	0,98	7,53	35467 * 10-6	19	11
T60006-E4040-W545	40 x 32 x 15	43,3	28,8	18,3	0,48	11,3	41,8	55,2	48	1,61	7,7	31269 * 10-6	19	10
Cores from VITROPERM 500Z for MagAmp and Spike Killer applications														
T60006-L2010-W759	10 x 7 x 4,5	11,7	5,5	6,1	0,054	2,67	1,1	12,7	11,9	0,059	2,27	282 * 10-6	94	57
T60006-L2011-W760	11 x 8 x 4,5	14,1	6,6	6,3	0,054	2,98	1,2	12,7	11,9	0,085	2,53	406 * 10-6	77	46
T60006-L2012-W761	12 x 8 x 4,5	14,1	6,6	6,3	0,072	3,14	1,7	16,9	15,8	0,085	2,53	542 * 10-6	77	46
T60006-L2012-W762	12,5 x 10 x 4,5	14,1	8,5	6,8	0,045	3,53	1,2	10,6	9,9	0,14	2,59	562 * 10-6	76	42
T60006-L2012-W803	12,8 x 9,5 x 3,2	14,7	7,9	4,8	0,042	3,5	1,1	9,9	9,3	0,121	2,26	456 * 10-6	79	44
T60006-L2016-W763	16 x 10 x 6	18	8	8,1	0,144	4,08	4,3	33,8	31,7	0,124	3,25	1592 * 10-6	57	34
T60006-L2016-W764	16,5 x 12,5 x 6	19,1	10,9	8,1	0,096	4,56	3,2	22,6	21,1	0,231	3,3	1971 * 10-6	53	30
T60006-L2017-W765	17,5 x 12,5 x 6	19,1	10,9	8,1	0,12	4,71	4,2	28,8	26,4	0,231	3,3	2463 * 10-6	53	30
T60006-L2019-W766	19 x 15,2 x 4,5	21,2	12,9	7,2	0,068	5,37	2,7	16,1	15	0,323	3,28	1967 * 10-6	49	27
T60006-L2020-W767	20 x 15 x 8	22,6	10,3	10,2	0,16	5,5	6,5	37,6	35,2	0,206	4,08	2933 * 10-6	42	26
T60006-L2020-W768	20 x 12,5 x 8	22,6	10,3	10,2	0,24	5,11	9	56,4	52,8	0,206	4,08	4399 * 10-6	42	26

T6000X-XX XXX-WXXX

4: Fix 350 (epoxy coating)

6: Fix 022 (plastic protection box)

Ex: VITROVAC

L2: VITROPERM

3 digit W or V number
(unique)

Outer diameter in mm
(nominal w/o fixation)



Fix 022: Plastic protection box, Ultramid (PA 66), glas fiber enforced
UL-File-No. E41871 (M), flamibility class UL 94 V-0
Temperature class 120°C (elektrical), 115°C mechanical with impact,
130°C mechanical w/o impact, form stability 250°C
Upper application temperature (20.000 hours, 50 % reduced tensile strength) 139°C

Fix 350: Epoxy coating, Resicoat EL ES FB
UL-File-No. E214934, flamibility class UL 94 V-0
Temperature class 105°C (elektrical), 105°C mechanical with impact,
105°C mechanical w/o impact
Electric strength for basic and higher insulation degrees: additional insulation
by tape or usage of an insulated special wire

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