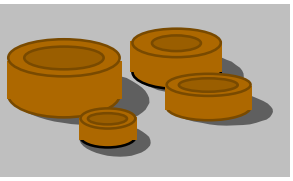
VITROPERM 500 F - VITROVAC 6030 F Tape-wound Cores for Power Transformers in SMPS



For power transformers in switched-mode power supplies, the nanocrystalline material VITROPERM 500 F and in certain applications the amorphous alloy VITROVAC 6030 F offer unique advantages:

- low losses with very small temperature dependence or even negative temperature coefficients.
- high saturation flux density which is almost completely retained at high temperatures. So the SMPS - designer can choose lower operating frequencies to save on power semiconductors and EMI - filtering.
- sufficiently high permeability and its low dependence of flux density and temperature.
- mechanical sturdiness of the coated cores and nearly no magnetostriction of the core material enables the design of moulded components. High vibration stresses are not critical for VITROPERM.

Usually nanocrystalline VITROPERM 500 F is the best choice due to the higher saturation flux density, the improved performance and lower cost compared to amorphous VITROVAC 6030 F. But, the higher permeability of VITROPERM transformers may be problematic for the reset behaviour in high-frequency single-ended forward converter topologies. We recommend to use VITROVAC 6030 F instead. In push-pull forward converters however, high permeabilities are advantageous in most cases.

Informations on core finish:

The cores are supplied epoxy coated (Fix 350) and are suitable for direct winding. The upper limiting temperature is 120 °C.

UL - File Nummer E 98282 and flame class are applied for.

Material data of VITROPERM 500 F/ VITROVAC 6030 F (typical values):

	VITROPERM 500 F	VITROVAC 6030 F
Saturation flux density (25 °C), B_s	1.2 T	0.8 T
Saturation flux density (100 °C), B_s	1.1 T	0.75 T
Losses (f = 20 kHz, at B_{max} = 0.2 T)	1.4 W/kg	2 W/kg
Losses (f = 100 kHz, at B_{max} = 0.2 T)	35 W/kg	40 W/kg
Curie temperature, T_c	600 °C	365 °C
Continuous upper operation temperature	120 °C	110 °C

VITROPERM 500 F and VITROVAC 6030 F - cores for transformers in SMPS, standard sizes:

core dimensions	finished dimensions (limiting values)			iron cross section and path length		core mass		A_L - value at 10 kHz typ.		winding cross section and turn length		thermal resistance	power at 20 kHz typical	part number, order code	
	O.D.	I.D.	H	A_{Fe}	l_{Fe}	m_{Fe} *	m_{Fe} **	A_L *	A_L **	A_{Cu} ***	l_{Cu}	R_{th} ****	P	VITROPERM 500 F	VITROVAC 6030 F
mm	mm	mm	mm	cm²	cm	g	g	µH	µH	cm²	cm	K/W	W	T60004-L2...	T60004-E3...
16x10x6	17.6	8.3	8	0.14	4.08	4.6	4.3	1.3	13	0.2	3.26	40	50	**016-W373**	**016-F002**
20x12.5x8	22	10.5	10	0.24	5.11	9.5	9	1.8	18	0.32	3.9	27	100	**020-W374**	**020-F008**
25x16x10	27	14	12	0.36	6.44	18	17	2.1	21	0.55	5.12	19	170	**025-W375**	**025-F006**
30x20x15	32.3	17.8	17.8	0.6	7.85	37	35	2.7	27	0.8	6.82	13	350	**030-W376**	**030-F003**
40x25x15	42.3	22.5	17.3	0.9	10.2		68		32	1.3	7.9	9	600	**040-W433**	-
50x40x20	52.3	37.1	22.8	0.8	14.1		83		20	3.5	10.3	5.5	1 200	**050-W434**	-
63x50x25	65.6	46.6	27.8	1.3	17.8		170		26	4.57	11.1	4	2 500	**063-W435**	-
80x63x25	82.6	59.3	27.8	1.62	22.5		267		27	6.97	12.5	3	4 000	**080-W436**	-
100x80x25	104	75	28.5	1.9	28.3		395		25	11.5	14.2	2	6 000	**100-W342**	-
130x100x25	134.5	95	28.5	2.85	36.1		757		30	18.2	16.8	1.5	11 000	**130-W352**	-

* VITROVAC 6030 F

** VITROPERM 500 F

*** At a winding factor of 0.5

**** Thermal resistance values are calculated based on an imaginary component using typical windings and a moulded design. No forced cooling. Values are valid for core- and windings losses and understood for a rough orientation only.

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