



For power transformers in switched-mode power supplies, the nanocrystalline material VITROPERM 500 F and 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 cost down 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.

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	cm ²	cm	g	g	μH	μH	cm ²	cm	K/W	W	T60004-L2	T60004-E3
16x10x6	17.6	8.3	8	0.14	4.08	4.3	4.6	11	1.3	0.2	3.18	33	50	016-W373	016-F002
20x12.5x8	22	10.5	10	0.24	5.11	9	9.5	14	1.8	0.32	3.97	23	100	020-W374	020-F008
25x16x10	27	14	12	0.36	6.44	17	18	17	2.1	0.58	4.80	16	170	025-W375	025-F006
30x20x15	32.3	17.8	17.8	0.57	7.85	33	37	20	2.7	0.93	6.41	11	350	030-W376	030-F003
40x25x15	42.3	22.5	17.3	0.86	10.2	64		23		1.49	7.21	7.5	600	040-W433	-
50x40x20	52.3	37.1	22.8	0.76	14.1	79		15		4.05	9.0	4.5	1 200	050-W434	-
52x40x25	54.3	37.1	27.8	1.14	14.5	121		22		4.05	10.2	4.1	2 000	052-W827	-
55x40x25	57.5	37.1	27.8	1.43	14.9	156		26		4.05	10.5	3.9	2 500	055-W848	-
63x50x25	65.6	46.6	27.8	1.24	17.8	161		19		6.40	11.1	3.1	2 500	063-W435	-
80x63x25	83.5	59.3	27.8	1.62	22.5	267		20		10.4	12.6	2.2	4 000	080-W436	-
100x80x25	104.5	74.5	28.5	1.9	28.3	395		19		16.4	14.6	1.6	6 000	100-W342	-
130x100x25	135.5	94.5	28.5	2.85	36.1	757		22		26.3	17.2	1.1	11 000	130-W352	-
160x110x25	165	105	28.5	4.75	36.1	1480		31		32.5	19.9	0.8	16 000	160-W758	-

* VITROVAC 6030 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.

** VITROPERM 500 F