Oxide/oxide ceramic matrix composite “Keramikblech”, Overview, (as of June 2023)

Keramikblech®
Walter E. C. Pritzkow Spezialkeramik

Keramikblech Type, old name	SvM1514N/SvM-Alu	MvM1415N	MvM1415N-2220	AvM 1415N	AvM 1415N-3000	FW12		FW30			
Keramikblech Type, new name	**SvM**	**MvM-3025**	**MvM-2220**	**AvM/610-1500**	**AvM/610-3000**	**N610-DF11-1500/ FW12**	**N610-DF13-4500/ FW12**	**N610-DF19/FW30**	**N720-EF11/FW12**	**N720-EF13-4500/ FW12**	**N720-EF19/FW30**
Fibre (Fabric)	Silika	Nitivy-3025T	Nitivy-2220S	Nextel 610/ 1500 denier (DF11-1500)	Nextel 610/ 3000 denier (DF19-3000)	Nextel 610/ 1500 denier (DF11-1500)	Nextel 610/ 4500 denier (DF13-4500)	Nextel 610/ 3000 denier (DF19-3000)	Nextel 720/ 1500 denier (EF11-1500)	Nextel 720/ 4500 Denier (EF13-4500)	Nextel 720/ 3000 denier (EF19-3000)
Matrix	65% Al_2O_3 35% SiO_2	70% Al_2O_3 30% SiO_2	70% Al_2O_3 30% SiO_2	70% Al_2O_3 30% SiO_2	70% Al_2O_3 30% SiO_2	85% Al_2O_3 15% 3YSZ	85% Al_2O_3 15% 3YSZ	85% Al_2O_3 15% 3YSZ	85% Al_2O_3 15% 3YSZ	85% Al_2O_3 15% 3YSZ	85% Al_2O_3 15% 3YSZ
Thickness per layer [mm]	0,75	0,5	0,75	0,3	0,5	0,25	0,35	0,45	0,3	0,5	0,55
Density [g/cm³]	1,5	1,9	1,9	2,3	2,3	2,5	2,6	2,6	2,6	2,5	2,5
Bending strength [MPa] anisotrop 0/90° at RT*	20-30	60-70	60-70	160-170[2]	120-130	350[3]	330[3]	273[5]	213,5	198	152,1
Young’s modulus (bending) [GPa] at RT*	–	–	–	78[2]	50	92[2], [1], [3]	100[3]	85[5]	–	–	–
Bending strength [MPa] anisotrop +/-45° at RT*	–	–	–	–	–	180	–	–	82	–	55,7
Bending strength [MPa] isotrop 0/90° at RT*	–	–	–	–	–	321	–	–	153,8	–	138,3
Tensile strength [MPa] anisotrop 0/90° at RT*	–	–	–	60-65[2], [3]	–	280[3]	250[3]	153[5]	146,8[3]	–	–
Young’s modulus (tension) [GPa] at RT*	–	–	–	78[2]	–	97[3]	83[3]	74[5]	51,5[3]	–	–
Tensile strength [MPa] anisotrop +/-45° at RT*	–	–	–	–	–	88,5[3]	–	–	33[3]	–	–
Tensile strength [MPa] at 1000 °C	–	–	–	35[3]	–	215[3]	–	–	167,7[3]	–	–
Tensile strength [MPa] at 1200 °C	–	–	–	35[3]	–	73[3]	–	–	157,2[3]	–	–
Compression strength [MPa] at RT*	–	–	–	62[2]	–	207[2]	–	216[5]	–	–	–
Young’s modulus (compression) [GPa] at RT*	–	–	–	93[2]	–	123[2]	–	70[5]	–	–	–
Shear strength (ILSS) [MPa] at RT*	–	–	–	10,5[2]	–	17[2], [1], [3]	15,5 [3]	17[5]	8,4[3]	7,4	–
Thermal expansion coefficient [10^{-6} 1/K]	2	6-8	6-8	6-8	6-8						
25–300 °C	–	–	–	–	–	6,94[1]	6,94[1]	6,94[1]	–	–	–
25–600 °C	–	–	–	–	–	7,69	7,69	7,69	–	–	–
25–900 °C	–	–	–	–	–	8,17	8,17	8,17	–	–	–
25–1100 °C	–	–	–	–	–	8,49	8,49	8,49	–	–	–
Thermal conductivity [W/mK]	‹ 1	‹ 1,5	‹ 1,5								
300 °C	–	–	–	2,44[4]	–	3,80[1]	3,80[1]	3,80[1]	–	–	–
600 °C	–	–	–	1,89	–	2,81	2,81	2,81	–	–	–
900 °C	–	–	–	1,63	–	2,30	2,30	2,30	–	–	–
1100 °C	–	–	–	1,52	–	2,02	2,02	2,02	–	–	–
Recommended continuous service temperature [°C]	‹ 950 °C	‹ 1150 °C	‹ 1150 °C	‹ 1300 °C	‹ 1300 °C	‹ 1300 °C	‹ 1300 °C	‹ 1300 °C	‹ 1300 °C	‹ 1300 °C	‹ 1300 °C
Recommended continuous service temperature [°C] with mechanical load	‹ 900 °C	‹ 1100 °C	‹ 1100 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C
Maximum continuous service temperature [°C] with high mechanical load	‹ 900 °C	‹ 1100 °C	‹ 1100 °C	‹ 1000 °C	‹ 1000 °C	‹ 1000 °C	‹ 1000 °C	‹ 1000 °C	‹ 1200 °C	‹ 1200 °C	‹ 1200 °C

(*at room temperature) Measured by FhG-ISC [1], FhG-IWM [2], Universität Bremen, Advanced Ceramics [3], TU Freiberg [4], Berner Fachhochschule TI [5], as of June 2023