

Meggitt A/S

Ferroperm™ Piezoceramics

Latest revision date: 05-10-2018

Navy Type / Industry "equivalent"	Symbol	Unit	Traditional Soft PZT			Traditional Hard PZT			Low-Acoustic Impedance Family				HIFU Family		Very Soft Relaxor-Ba		High Temp
			Pz23	Pz27	Pz29	Pz24	Pz26	Pz89	Pz31	Pz36	Pz37 HD	Pz39	Pz34	Pz54	Pz21	Pz94	Pz46
			N/A	Navy 2 "PZT5A"	Navy 6 "PZT5H"	"PZT7A"	Navy 1 "PZT4D"	P189** Navy 3 "PZT8"	"K81"	N/A	N/A	N/A	"PZT2"	N/A	"3203HD"	"3203HD"	"K15"
Electrical Properties																	
Relative Free Dielectric Constant (1 kHz)	K_{33}^T		1500	1800	2820	420	1300	1180	295	850	1200	2650	220	2800	3650	4300	115
Dielectric dissipation factor (1 kHz)	$\tan \delta (3^\sigma)$	10^{-3}	15	17	19	3	3	3	4	3	17	3	14	3	18	25	4
Curie Temperature	$T_C >$	°C	350	350	235	330	330	320	330	330	350	220	400	220	220	185	650
Recommended maximum working range	$T <$	°C	250	250	150	230	230	220	230	230	250	130	150	130	130	85	550
Electromechanical Properties																	
	k_p		0,51	0,59	0,62	0,50	0,56	0,53	0,30	0,37	0,38	0,35	0,07	0,56	0,58	0,59	0,03
Coupling factors	k_t		0,43	0,47	0,51	0,50	0,47	0,47	0,52	0,51	0,52	0,52	0,42	0,48	0,47	0,46	0,20
	k_{31}		-0,29	-0,33	-0,37	-0,29	-0,33	-0,32			-0,15		-0,05	-0,35	-0,34	-0,38	-0,02
	k_{33}		0,65	0,70	0,75	0,57	0,68	0,65			0,60		0,40	0,70	0,69	0,70	0,09
	$-d_{31}$	10^{-12} C/N	130	170	240	55	130	108					5	200	250	305	2
Piezoelectric charge coefficients	d_{33}	10^{-12} C/N	330	440	575	160	300	280	160	260	380	230	50	460	580	670	20
	d_{15}	10^{-12} C/N	420	500	700	150	330	280					40		620		16
Piezoelectric voltage coefficients	g_{31}	-10^{-3} V m/N	10	11	10	16	11	-11					3		7	-7	2
	g_{33}	10^{-3} V m/N	25	27	23	54	28	23	54	40	40	28	25	20	18	15	17
	N_p	m/s	2160	2010	1990	2400	2230	2350			1800	1920	2770	2120	2030	1980	2470
Frequency constants	N_t	m/s	2030	1980	1960	2100	2040	2150	1520	1530	1450	1550	2170	1980	1970	1970	1950
	N_{31}	m/s	1480	1400	1410	1670	1500	1750					2050		1375	1380	1900
	N_{33}	m/s	1600	1500	1500	1600	1800	2060							1325	1830	
Mechanical Properties																	
Acoustic Impedance	Z_a	Mrayl							19	19	18	18					
Density	ρ	kg/m ³	7700	7700	7450	7700	7700	7650	6200	6300	6400	6400	7650	7800	7800	7900	6400
Mechanical quality factor	$Q_{m,t}^E$		100	80	90	>1000	>1000	>1000	900	500	50	70	>1000	1500	65	60	>600

Notes

Pz31, Pz36, Pz37, Pz39 are a new family of materials containing a porous structure. Tolerances might therefore vary more than standard, and be more dependent on size and geometry.

P189 and P194 are a part of a full technology transfer of the Quartz & Selice programme from Saint-Gobain Quartz to Meggitt A/S in 2010

General Please be aware that extreme dimensions and geometries can lead to exaggeration in tolerances in all materials.

Not in catalogue - not sold to new customers

Standard tolerances:

- Electrical Properties ± 10 %
- Electromechanical Properties ± 5 %
- Mechanical Properties ± 2.5 % (Except for Q_m)