

Material Selection Guide

Fuji Ceramics always has dozens of types of piezoelectric materials.

This time, we will introduce 7 types of piezoelectric materials with properties close to those of piezoelectric materials often used internationally.

In addition, we will also consider feasibility on special request, so please contact us from the inquiry form if you have any requests.

Material No.	Compare With	Applications	Characteristics
C-21	Navy I PZT-4	Ultrasonic cleaners sonars Ultrasonic device for cosmetic	For high power driving
C-204	Navy I PZT-4	Ultrasonic humidifiers	Middle Qm High k_{33} High d_{33}
C-64	Navy II PZT-5A	Ultrasonic flowmeters Bubble detective sensors	High Tc
C-602	Navy II PZT-5A	In-vehicle sensors Ultrasonic level meters	High Tc Stable temp. coefficient
C-203	Navy III PZT-8	Ultrasonic cleaners Ultrasonic welders Ultrasonic cutters	High d_{33} High Qm High Tc
C-62	Navy V PZT-5J	Ultrasonic medical probes	High k_{33} High d_{33}
C-82	Navy VI PZT-5H	Ultrasonic medical probes	High ϵ_{33}^T High d_{33} Low Qm

Material Properties

Compare with			Navy I PZT-4		Navy II PZT-5A		Navy III PZT-8	Navy V PZT-5J	Navy VI PZT-5H
Material No.			C-21	C-204	C-64	C-602	C-203	C-62	C-82
Coupling coefficients	$\times 10^{-2}$	K_p	59	63	63	53	59	68	65
		K_{31}	34	37	35	28	35	40	37
		K_{33}	71	74	73	68	71	77	75
		K_t	48	52	50	46	49	52	51
		K_{15}	74	71	71	64	70	76	70
Frequency constants	m·Hz	N_p	2,210	2,110	1,970	2,160	2,130	1,960	2,030
		N_{31}	1,630	1,530	1,380	1,510	1,530	1,440	1,430
		N_{33}	1,510	1,450	1,360	1,480	1,470	1,350	1,390
		N_t	2,090	2,070	1,970	2,100	2,020	2,040	2,090
		N_{15}	910	930	850	950	920	850	900
Dielectric constants		$\epsilon_{11}^T / \epsilon_0$	1,900	2,240	1,960	1,560	1,470	2,730	3,090
		$\epsilon_{33}^T / \epsilon_0$	1,400	2,200	1,850	1,520	1,450	2,600	3,650
Dissipation factor	%	$\tan \delta$	0.25	0.25	1.5	1.3	0.3	1.65	1.9
Piezoelectric charge constants	$\times 10^{-12}$ m/V	d_{31}	-131	-190	-185	-120	-145	-234	-266
		d_{33}	288	435	435	310	325	500	600
		d_{15}	634	650	670	460	520	860	781
Piezoelectric voltage constants	$\times 10^{-3}$ V·m/N	g_{31}	-10.7	-9.7	-11.4	-9	-11.2	-10.6	-8.3
		g_{33}	27.2	22	24.4	23	25.6	24.4	18.5
		g_{15}	37.7	32.7	38.5	33	39.6	35.6	28.6
Young's modulus	$\times 10^{10}$ N/m ²	Y_{11}^E	8.3	7.2	5.9	7.2	7.2	6.3	6.2
		Y_{33}^E	6.4	5.7	5.1	6.3	6	4.9	5.1
		Y_{55}^E	2.3	2.4	2	2.6	2.3	1.9	2.2
Poisson's ratio		σ	0.29	0.29	0.34	0.36	0.29	0.3	0.34
Mechanical Q		Qm	1,400	520	80	100	2,000	75	65
Curie point	°C	Tc	307	250	345	360	350	245	195
Density	$\times 10^3$ kg/m ³	ρ	7.8	7.7	7.7	7.9	7.7	7.6	7.5
Temp. coefficients	fr (ppm/°C)	frTc -40~20°C	110	140	-180	30	240	-380	-260
		frTc 20~80°C	110	120	180	70	240	170	30
	C (ppm/°C)	CTc -40~20°C	1,810	1,900	3,500	1,800	1,900	3,860	3,650
		CTc 20~80°C	3,630	3,600	3,600	2,100	3,200	5,610	5,440

Note : The property data and specifications described in this paper are reference values only and are not guaranteed values.

In addition, please note that specifications may be changed without notice for improvement.

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