



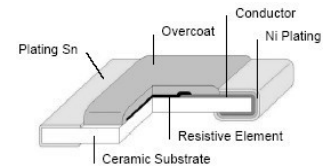
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RESISTOR MATERIAL COMPOSITION – THICK FILM CHIP RESISTORS (non precision type)

CR, CJ Series



This statement pertains to the following directive 2011/65/EC of the European Parliament and of the Council of the European Union on the restriction of the use of certain hazardous substances in electrical and electronic equipment. The definition of LEAD-FREE products is external terminal meet Lead Free. RoHS exemption 7 (c)-1, Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectronics devices, or in a glass or ceramic matrix compound (2011/65/EU)

CAS no.	Material	Substance	CR20		CR05		CR16		CR10	
			Mass mg	%	Mass mg	%	Mass mg	%	Mass mg	%
1344-28-1	Ceramic Substrate	Al2O3	0.1349	80.59%	0.4109	80.61%	1.5952	83.02%	3.6667	86.04%
60676-86-0		SiO2	0.0056	3.36%	0.0171	3.36%	0.0665	3.46%	0.1528	3.58%
7440-22-4	Conductor Layer (Bottom)	Ag	0.0017	1.05%	0.0053	1.05%	0.0121	0.63%	0.0233	0.55%
65997-17-3		Glass	0.0001	0.06%	0.0003	0.06%	0.0006	0.03%	0.0012	0.03%
7440-22-4	Conductor Layer (Top)	Ag	0.0013	0.80%	0.0041	0.80%	0.0252	1.31%	0.0456	1.07%
7440-05-03		Pd	0.0000	0.01%	0.0001	0.01%	0.0003	0.02%	0.0006	0.01%
65997-17-3		Glass	0.0003	0.20%	0.0010	0.20%	0.0064	0.33%	0.0116	0.27%
12036-10-1	Resistive Element	RuO2	0.0004	0.23%	0.0012	0.23%	0.0033	0.17%	0.0049	0.11%
7440-22-4		Ag	0.0006	0.37%	0.0019	0.37%	0.0053	0.27%	0.0078	0.18%
1317-36-8		PbO	0.0002	0.14%	0.0007	0.14%	0.0020	0.10%	0.0029	0.07%
65997-17-3		Glass	0.0003	0.18%	0.0009	0.18%	0.0026	0.14%	0.0039	0.09%
25068-38-6	Over-Coating	Epoxy	0.0034	2.05%	0.0105	2.05%	0.0304	1.58%	0.0665	1.56%
25068-38-6	Marking	Epoxy	0.0000	0.00%	0.0000	0.00%	0.0031	0.16%	0.0036	0.08%
7440-02-0	End Terminal	Ni	0.0005	0.29%	0.0015	0.29%	0.0020	0.10%	0.0027	0.06%
7440-47-3		Cr	0.0001	0.07%	0.0004	0.07%	0.0005	0.03%	0.0007	0.02%
7440-02-0	Ni Plating	Ni	0.0094	5.60%	0.0285	5.60%	0.0877	4.57%	0.1411	3.31%
7440-31-5	Sn Plating	Sn	0.0084	4.99%	0.0255	4.99%	0.0783	4.07%	0.1259	2.95%
All of the above are approximate values by the component parts of the material			0.1674	100	0.5098	100	1.9216	100	4.2617	100

CAS no.	Material	Substance	CR18		CR14		CR12		CR01	
			Mass mg	%	Mass mg	%	Mass mg	%	Mass mg	%
1344-28-1	Ceramic Substrate	Al2O3	7.4778	87.54%	12.4631	84.80%	19.5421	87.33%	32.4533	86.64%
60676-86-0		SiO2	0.3116	3.65%	0.5193	3.53%	0.8143	3.64%	1.3522	3.61%
7440-22-4	Conductor Layer (Bottom)	Ag	0.0266	0.31%	0.0581	0.40%	0.0581	0.26%	0.0775	0.21%
65997-17-3		Glass	0.0014	0.02%	0.0031	0.02%	0.0031	0.01%	0.0041	0.01%
7440-22-4	Conductor Layer (Top)	Ag	0.0919	1.08%	0.1801	1.23%	0.2203	0.98%	0.3416	0.91%
7440-05-03		Pd	0.0012	0.01%	0.0023	0.02%	0.0028	0.01%	0.0043	0.01%
65997-17-3		Glass	0.0233	0.27%	0.0456	0.31%	0.0558	0.25%	0.0865	0.23%
12036-10-1	Resistive Element	RuO2	0.0109	0.13%	0.0227	0.15%	0.0373	0.17%	0.0653	0.17%
7440-22-4		Ag	0.0174	0.20%	0.0363	0.25%	0.0596	0.27%	0.1045	0.28%
1317-36-8		PbO	0.0065	0.08%	0.0136	0.09%	0.0224	0.10%	0.0392	0.10%
65997-17-3		Glass	0.0087	0.10%	0.0182	0.12%	0.0298	0.13%	0.0523	0.14%
25068-38-6	Over-Coating	Epoxy	0.1121	1.31%	0.2100	1.43%	0.3943	1.76%	0.6565	1.75%
25068-38-6	Marking	Epoxy	0.0115	0.13%	0.0115	0.08%	0.0244	0.11%	0.0421	0.11%
7440-02-0	End Terminal	Ni	0.0038	0.04%	0.0076	0.05%	0.0074	0.03%	0.0095	0.03%
7440-47-3		Cr	0.0010	0.01%	0.0019	0.01%	0.0018	0.01%	0.0024	0.01%
7440-02-0	Ni Plating	Ni	0.2310	2.70%	0.5835	3.97%	0.5835	2.61%	1.1447	3.06%
7440-31-5	Sn Plating	Sn	0.2060	2.41%	0.5205	3.54%	0.5205	2.33%	1.0213	2.73%
All of the above are approximate values by the component parts of the material			8.5426	100	14.6973	100	22.3774	100	37.4572	100