

MATERIAL DECLARATION SHEET



Material Number	WS-Series (scroll down for specific model)			
Product Line	Wire-wound Anti Surge Fixed Resistors			
Compliance Date	2014-07-28			
RoHS Compliant	Compliant	MSL	N/A	

No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg]	Homogeneous Material\ Substances	CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-1M	Substrate (Ceramic)	235.70	Aluminum oxide	1344-28-1	69.20	28.95	41.83
				Silicon dioxide	14808-60-7	24.60	10.29	
				Magnesium oxide	1309-48-4	0.94	0.39	
				Barium oxide	1305-78-8	3.16	1.32	
				Calcium oxide	1304-28-5	1.81	0.76	
				Potassium oxide	12136-45-7	0.29	0.12	
2		Resistive layer (Ni-Cr Alloy)	3.48	Nickel	7440-02-0	80	0.49	0.61
				Chromium	7440-47-3	20	0.12	
3		End cap	86.35	Copper	7440-50-8	4.38	0.67	15.32
				Tin	7440-31-5	2.92	0.45	
				Iron	7439-89-6	92.70	14.21	
4		Lead wire	173.45	Copper	7440-50-8	97.00	29.86	30.79
				Tin	7440-31-5	3.00	0.93	
5		Coating	64.50	Epoxy Resin	26875-67-2	58.00	6.641	11.45
				Calcium carbonate	471-34-1	26.00	2.977	
				Titanium dioxide	13463-67-7	16.00	1.832	
		Total weight	563.48					

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No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg] Homogeneous Material\ Substances		CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-1A WS-2M	Substrate (Ceramic)	280.9	Aluminum oxide	1344-28-1	69.20	26.46	38.24
				Silicon dioxide	14808-60-7	24.60	9.41	
				Magnesium oxide	1309-48-4	0.94	0.36	
				Barium oxide	1305-78-8	3.16	1.21	
				Calcium oxide	1304-28-5	1.81	0.69	
				Potassium oxide	12136-45-7	0.29	0.11	
2		Resistive layer (Ni-Cr Alloy)	5.5	Nickel	7440-02-0	80	0.60	0.75
				Chromium	7440-47-3	20	0.15	
3		End cap	148.2	Copper	7440-50-8	4.38	0.88	20.17
				Tin	7440-31-5	2.92	0.59	
				Iron	7439-89-6	92.70	18.70	
4		Lead wire	191.0	Copper	7440-50-8	97.00	25.22	26.00
				Tin	7440-31-5	3.00	0.78	
5		Coating	109.0	Epoxy Resin	26875-67-2	58.00	8.61	14.84
				Calcium carbonate	471-34-1	26.00	3.86	
				Titanium dioxide	13463-67-7	16.00	2.37	
		Total weight	734.6					

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No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg] Homogeneous Material\ Substances		CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-2A WS-3M	Substrate (Ceramic)	421.26	Aluminum oxide	1344-28-1	69.21	27.81	40.18
				Silicon dioxide	14808-60-7	24.58	9.88	
				Magnesium oxide	1309-48-4	0.94	0.38	
				Barium oxide	1305-78-8	3.16	1.27	
				Calcium oxide	1304-28-5	1.81	0.73	
				Potassium oxide	12136-45-7	0.29	0.12	
2		Resistive layer (Ni-Cr Alloy)	6.25	Nickel	7440-02-0	80	0.48	0.60
				Chromium	7440-47-3	20	0.12	
3		End cap	172.47	Copper	7440-50-8	4.38	0.72	16.45
				Tin	7440-31-5	2.92	0.48	
				Iron	7439-89-6	92.71	15.25	
4		Lead wire	225.73	Copper	7440-50-8	97.00	20.88	21.53
				Tin	7440-31-5	3.00	0.65	
5		Coating	222.78	Epoxy Resin	26875-67-2	58.00	12.32	21.24
				Calcium carbonate	471-34-1	26.00	5.52	
				Titanium dioxide	13463-67-7	16.00	3.40	
		Total weight	1048.49					

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No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg] Homogeneous Material\ Substances		CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-3A WS-5M	Substrate (Ceramic)	925.0	Aluminum oxide	1344-28-1	69.20	40.35	58.31
				Silicon dioxide	14808-60-7	24.60	14.34	
				Magnesium oxide	1309-48-4	0.94	0.55	
				Barium oxide	1305-78-8	3.16	1.84	
				Calcium oxide	1304-28-5	1.81	1.06	
				Potassium oxide	12136-45-7	0.29	0.17	
2		Resistive layer (Ni-Cr Alloy)	4.0	Nickel	7440-02-0	80.00	0.20	0.25
				Chromium	7440-47-3	20.00	0.05	
3		End cap	234.4	Copper	7440-50-8	19.70	2.91	14.78
				Tin	7440-31-5	74.00	10.93	
				Iron	7439-89-6	3.80	0.56	
				Silicon	7440-21-3	0.20	0.03	
				Oxygen	39297-19-3	2.30	0.34	
4		Lead wire	235.0	Epoxy Resin	7440-50-8	97.00	14.37	14.81
				Calcium carbonate	7440-31-5	3.00	0.44	
5		Coating	188.0	Titanium dioxide	26875-67-2	58.00	6.87	11.85
				Aluminum oxide	471-34-1	26.00	3.08	
				Silicon dioxide	13463-67-7	16.00	1.90	
		Total weight	1586.4					

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No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg] Homogeneous Material\ Substances		CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-5A	Substrate (Ceramic)	2736.8	Aluminum oxide	1344-28-1	69.20	43.33	62.63
				Silicon dioxide	14808-60-7	24.60	15.40	
				Magnesium oxide	1309-48-4	0.94	0.59	
				Barium oxide	1305-78-8	3.16	1.98	
				Calcium oxide	1304-28-5	1.81	1.13	
				Potassium oxide	12136-45-7	0.29	0.18	
2		Resistive layer (Ni-Cr Alloy)	77.2	Nickel	7440-02-0	80.00	1.41	1.76
				Chromium	7440-47-3	20.00	0.35	
3		End cap	199.4	Copper	7440-50-8	19.70	0.90	4.56
				Tin	7440-31-5	74.00	3.38	
				Iron	7439-89-6	3.80	0.17	
				Silicon	7440-21-3	0.20	0.01	
				Oxygen	39297-19-3	2.30	0.10	
4		Lead wire	319.0	Epoxy Resin	7440-50-8	97.00	7.08	7.30
				Calcium carbonate	7440-31-5	3.00	0.22	
5		Coating	1038.0	Titanium dioxide	26875-67-2	58.00	13.78	23.75
				Aluminum oxide	471-34-1	26.00	6.17	
				Silicon dioxide	13463-67-7	16.00	3.80	
		Total weight	4370.4					

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No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg] Homogeneous Material\ Substances		CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-7M	Substrate (Ceramic)	2736.8	Aluminum oxide	1344-28-1	69.20	43.09	62.26
				Silicon dioxide	14808-60-7	24.60	15.32	
				Magnesium oxide	1309-48-4	0.94	0.59	
				Barium oxide	1305-78-8	3.16	1.97	
				Calcium oxide	1304-28-5	1.81	1.13	
				Potassium oxide	12136-45-7	0.29	0.18	
2		Resistive layer (Ni-Cr Alloy)	77.2	Nickel	7440-02-0	80.00	1.41	1.76
				Chromium	7440-47-3	20.00	0.35	
3		End cap	224.5	Copper	7440-50-8	19.70	1.01	5.11
				Tin	7440-31-5	74.00	3.78	
				Iron	7439-89-6	3.80	0.19	
				Silicon	7440-21-3	0.20	0.01	
				Oxygen	39297-19-3	2.30	0.12	
4		Lead wire	319.0	Epoxy Resin	7440-50-8	97.00	7.04	7.26
				Calcium carbonate	7440-31-5	3.00	0.22	
5		Coating	1038.0	Titanium dioxide	26875-67-2	58.00	13.69	23.61
				Aluminum oxide	471-34-1	26.00	6.14	
				Silicon dioxide	13463-67-7	16.00	3.78	
		Total weight	4395.5					

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No .	Construction Element(subpart)	Homogeneous Material	Material weight [mg] Homogeneous Material\ Substances		CASRN if applicable	Materials Mass %	Material Mass % of total unit wt.	Subpart mass of total wt. (%)
1	WS-7A WS-8M	Substrate (Ceramic)	3355.00	Aluminum oxide	1344-28-1	69.20	45.33	65.50
				Silicon dioxide	14808-60-7	24.60	16.11	
				Magnesium oxide	1309-48-4	0.94	0.62	
				Barium oxide	1305-78-8	3.16	2.07	
				Calcium oxide	1304-28-5	1.81	1.18	
				Potassium oxide	12136-45-7	0.29	0.19	
2		Resistive layer (Ni-Cr Alloy)	17.65	Nickel	7440-02-0	80.00	0.28	0.35
				Chromium	7440-47-3	20.00	0.07	
3		End cap	315.10	Copper	7440-50-8	4.38	0.27	6.15
				Tin	7440-31-5	2.92	0.18	
				Iron	7439-89-6	92.70	5.70	
4		Lead wire	319.00	Epoxy Resin	7440-50-8	97.00	6.04	6.23
				Calcium carbonate	7440-31-5	3.00	0.19	
5		Coating	1115.20	Titanium dioxide	26875-67-2	58.00	12.63	21.77
				Aluminum oxide	471-34-1	26.00	5.66	
				Silicon dioxide	13463-67-7	16.00	3.48	
		Total weight	5121.95					

Document updated: May 28, 2015