

EMERSONS

LABORATORY QUALITY CATALOGUE

EMSONS PRODUCTS PRIVATE LIMITED

LABORATORY QUALITY REPORT

(AS PER IS 13730)

The values mentioned in this catalogue are our standard observations for the wires manufactured in our facilities across a long timespan and the values of the supplied wires are as per the customer's specific requirements .

This catalogue is for a general understanding of the ***International Standards*** and how our wires fall in line with the same .

This catalogue is just a reference benchmark for our in house **LABORATORY QUALITY REPORT**

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PRODUCT RANGE & QUALITY SPECIFICATIONS

Wire Type Properties	Modified Polyester	Modified Polyester	Polyesterimide	Dual Coated Wire PE/PEI + PAI
Thermal Class Class Insulation Colour	130 B Brown / Reddish-Golden	155 F Light Brown to Dark Brown	180 H Dark Brown (Mahogany)	200 H+ Reddish Brown to Golden
Range-Copper Range-Aluminium	0.06 to 5.0 mm 0.25 to 5.0 mm	0.06 to 3.0 mm 0.25 to 5.0 mm	0.06 to 5.0 mm 0.25 to 5.0 mm	0.06 to 4.0 mm 0.25 to 5.0 mm
Specifications-Copper Specifications-Aluminium	IS 13730-34 IEC 60317-34 IS 13730-9 IEC 60317-9 for 1.00 mm wire	IS 13730-3 IEC 60317-3 for 1.00 mm Wire	IS 13730-8 IEC 60317-8 IS 13730-15 IEC 60317-15 for 1.00 mm wire	IS 13730-13 IEC 60317-13 NEMA MW 35A/35C IEC 60317-25 for Aluminium
Mechanical Tests Flexibility Peel Abrasion Av. N Aluminium	1 x D N x D = 150 10.4 5.20	1 x D N x D = 130 10.4 -	1 x D N x D = 110 10.9 5.45	1 x D N x D = 110 11.3 6.75
Thermal Tests Heat Shock Cut Through Heat Shock - Aluminium	6 x D 155°C - 30 min 240°C - 2 min 6.33Ø - 155°C - 30 min	2.24 x D 175°C - 30 min 240°C - 2 min -	2.24 x D 200°C - 30 min 300°C - 2 min 3.35Ø -200°C - 30 min	2.24 x D 220°C - 30 min 320°C - 2 min 15% Str - 3xd - 240°C
Chemical Tests Solvent Resistance Refrigerant Resistant Solderability Transformer Oil	Good N.A. N.A. N.A.	Good N.A. N.A. N.A.	Very Good Very Good N.A. Excellent	Excellent Excellent N.A. Excellent
Resistance Electrical Resistance Breakdown Voltage Cont. of Covering (Pin Holes) Tandent Delta - Bending Point	Within Range Above 8.0 KV Normally - Nil 110 - 120	Within Range Above 8.0 KV Normally - Nil 145 - 155	Within Range Above 8.0 KV Normally - Nil 175 - 195	Within Range Above 8.0 KV Normally - Nil 175 - 195
Application	Domestic equipments, pumps, motors, stabilizers, transformers, fans and auto electricals requiring high mechanical properties.	General purpose rotating & static equipments like large pump motors, generators, air cooled transformers, voltage stabilizers, heavy duty domestic appliances like mixer - grinder, washing machines, where temprature is above class insulation B.	Continuously rated heavy duty motors and tools, oil filled transformers, hermatic grade for AC and refriragerator compressor, furnace motors, and for all class insulation H applications.	Special purpose machines like wind generators, large motors and generators, extra heavy duty equipments like crane motors with heavy shock loads, AC and refrigerator compressor windings.

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<i>ANALYSIS FOR GIVEN SWG</i>	SWG 23	SWG 24	SWG 25	SWG 26	SWG 27
CONDUCTOR DIAMETER	0.610mm (± 0.002 mm)	0.556mm (± 0.002 mm)	0.505mm (± 0.002 mm)	0.453mm (± 0.002 mm)	0.411mm (± 0.002 mm)
OVERALL DIAMETER	0.657 mm (± 0.004 mm)	0.610 mm (± 0.004 mm)	0.558 mm (± 0.004 mm)	0.810 mm (± 0.004 mm)	0.455 mm (± 0.004 mm)
RESISTANCE	0.61 Ω	0.72 Ω	0.88 Ω	0.108 Ω	0.133 Ω
ELONGATION	36%	34%	33%	34%	32%
BREAKDOWN VOLTAGE	6600/6500/6300	6500/6200/6300	6500/6200/6300	6200/6300/6500	6200/6300/6500
PINHOLE	0	0	0	0	0
JERK TEST BELOW 1000mm AND INCLUDING	PASS	PASS	PASS	PASS	PASS
HEAT SHOCK @175°	PASS	PASS	PASS	PASS	PASS
CUT THROUGH @240°	PASS	PASS	PASS	PASS	PASS
PHYSICAL PROPERTIES & VISUAL APPEARANCE	OK	OK	OK	OK	OK
FLEXIBILITY & ADHERANCE	OK	OK	OK	OK	OK
SOLVENT TEST	OK	OK	OK	OK	OK

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<i>ANALYSIS FOR GIVEN SWG</i>	SWG 28	SWG 29	SWG 30	SWG 31	SWG 32
CONDUCTOR DIAMETER	0.372mm (± 0.002 mm)	0.342mm (± 0.002 mm)	0.314mm (± 0.002 mm)	0.292mm (± 0.002 mm)	0.273mm (± 0.002 mm)
OVERALL DIAMETER	0.410 mm (± 0.004 mm)	0.390 mm (± 0.004 mm)	0.350 mm (± 0.004 mm)	0.330 mm (± 0.004 mm)	0.310 mm (± 0.004 mm)
RESISTANCE	0.162 Ω	0.190 Ω	0.225 Ω	0.263 Ω	0.304 Ω
ELONGATION	34%	32%	31%	32%	33%
BREAKDOWN VOLTAGE	6000/6200/6300	5500/5100/5300	5200/5100/5000	5800/5500/5300	5500/5100/5300
PINHOLE	0	1	2	1	0
JERK TEST BELOW 1000mm AND INCLUDING	PASS	PASS	PASS	PASS	PASS
HEAT SHOCK @175°	PASS	PASS	PASS	PASS	PASS
CUT THROUGH @240°	PASS	PASS	PASS	PASS	PASS
PHYSICAL PROPERTIES & VISUAL APPEARANCE	OK	OK	OK	OK	OK
FLEXIBILITY & ADHERANCE	OK	OK	OK	OK	OK
SOLVENT TEST	OK	OK	OK	OK	OK

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<i>ANALYSIS FOR GIVEN SWG</i>	SWG 33	SWG 34	SWG 35	SWG36	SWG 37
CONDUCTOR DIAMETER	0.251mm (± 0.002 mm)	0.231mm (± 0.002 mm)	0.208mm (± 0.002 mm)	0.189mm (± 0.002 mm)	0.171mm (± 0.002 mm)
OVERALL DIAMETER	0.290 mm (± 0.004 mm)	0.262 mm (± 0.004 mm)	0.238 mm (± 0.004 mm)	0.220 mm (± 0.004 mm)	0.198 mm (± 0.004 mm)
RESISTANCE	0.354 Ω	0.419 Ω	0.514 Ω	0.629 Ω	0.776 Ω
ELONGATION	33%	33%	32%	30%	29%
BREAKDOWN VOLTAGE	5200/5100/5000	5200/5300/5100	4600/4300/4000	4300/4100/4000	4400/4200/4100
PINHOLE	0	2	2	0	4
JERK TEST BELOW 1000mm AND INCLUDING	PASS	PASS	PASS	PASS	PASS
HEAT SHOCK @175°	PASS	PASS	PASS	PASS	PASS
CUT THROUGH @240°	PASS	PASS	PASS	PASS	PASS
PHYSICAL PROPERTIES & VISUAL APPEARANCE	OK	OK	OK	OK	OK
FLEXIBILITY & ADHERANCE	OK	OK	OK	OK	OK
SOLVENT TEST	OK	OK	OK	OK	OK

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<i>ANALYSIS FOR GIVEN SWG</i>	SWG 38	SWG 39	SWG 40		
CONDUCTOR DIAMETER	0.150mm (± 0.002 mm)	0.130mm (± 0.002 mm)	0.120mm (± 0.002 mm)		
OVERALL DIAMETER	0.180 mm (± 0.004 mm)	0.149 mm (± 0.004 mm)	0.140 mm (± 0.004 mm)		
RESISTANCE	0.985 Ω	1.300 Ω	1.510 Ω		
ELONGATION	29%	30%	30%		
BREAKDOWN VOLTAGE	3800/3800/3700	3400/3500/3500	3500/3500/3500		
PINHOLE	3	2	3		
JERK TEST BELOW 1000mm AND INCLUDING	PASS	PASS	PASS		
HEAT SHOCK @175°	PASS	PASS	PASS		
CUT THROUGH @240°	PASS	PASS	PASS		
PHYSICAL PROPERTIES & VISUAL APPEARANCE	OK	OK	OK		
FLEXIBILITY & ADHERANCE	OK	OK	OK		
SOLVENT TEST	OK	OK	OK		

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DIAMETERS AND INCREASE IN DIAMETERS OF ENAMELLED ROUND WINDING WIRES BASIS: IS 13730-0-1)								
Conductor Diameter		Conductor Tolerance	Grade 1		Grade 2		Grade 3	
(mm)	swg	(mm)	Minimum Increase (mm)	Maximum Increase (mm)	Minimum Increase (mm)	Maximum Increase (mm)	Minimum Increase (mm)	Maximum Increase (mm)
0.04		-	-	0.049	-	0.054	-	-
0.041	48	-	-	0.05	-	0.056	-	-
0.043		-	-	0.052	-	0.058	-	-
0.045		-	-	0.055	-	0.061	-	-
0.048		-	-	0.059	-	0.065	-	-
0.05		-	-	0.06	-	0.066	-	-
0.051	47	-	-	0.062	-	0.068	-	-
0.053		-	-	0.064	-	0.07	-	-
0.056		-	-	0.067	-	0.074	-	-
0.06		-	-	0.072	-	0.079	-	-
0.061	46	-	-	0.074	-	0.081	-	-
0.063		-	-	0.076	-	0.083	-	-
0.067		0.003	0.007	0.08	0.012	0.088	0.018	-
0.071		0.003	0.007	0.084	0.012	0.091	0.018	0.097
0.071	45	0.003	0.007	0.084	0.012	0.091	0.018	0.097
0.075		0.003	0.007	0.089	0.014	0.095	0.02	0.102
0.08		0.003	0.008	0.094	0.014	0.101	0.02	0.108
0.081	44	0.003	0.008	0.096	0.015	0.103	0.022	0.11
0.085		0.003	0.008	0.1	0.015	0.107	0.022	0.114
0.09		0.003	0.008	0.105	0.015	0.113	0.022	0.12
0.091	43	0.003	0.008	0.107	0.016	0.115	0.023	0.122
0.095		0.003	0.008	0.111	0.016	0.119	0.023	0.126
0.1		0.003	0.008	0.117	0.016	0.125	0.023	0.132
0.102	42	0.003	0.009	0.119	0.017	0.128	0.026	0.136
0.106		0.003	0.009	0.123	0.017	0.132	0.026	0.14
0.112		0.003	0.009	0.13	0.017	0.139	0.026	0.147
0.112	41	0.003	0.009	0.13	0.017	0.139	0.026	0.147
0.118		0.003	0.01	0.136	0.019	0.145	0.028	0.154
0.122	40	0.003	0.01	0.141	0.019	0.151	0.028	0.16
0.125		0.003	0.01	0.144	0.019	0.154	0.028	0.163
0.132		0.003	0.011	0.152	0.021	0.162	0.03	0.171
0.132	39	0.003	0.011	0.152	0.021	0.162	0.03	0.171
0.14		0.003	0.011	0.16	0.021	0.171	0.03	0.181
0.15		0.003	0.012	0.171	0.023	0.182	0.033	0.193
0.152	38	0.003	0.012	0.174	0.023	0.186	0.033	0.197
0.16		0.003	0.012	0.182	0.023	0.194	0.033	0.205
0.17		0.003	0.013	0.194	0.025	0.208	0.036	0.217
0.173	37	0.003	0.013	0.197	0.025	0.21	0.036	0.222
0.18		0.003	0.013	0.204	0.025	0.217	0.036	0.229
0.19		0.003	0.014	0.216	0.027	0.228	0.039	0.24
0.193	36	0.003	0.014	0.219	0.027	0.232	0.039	0.245
0.2		0.003	0.014	0.226	0.027	0.239	0.039	0.252

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DIAMETERS AND INCREASE IN DIAMETERS OF ENAMELLED ROUND WINDING WIRES BASIS: IS 13730-0-1)								
Conductor Diameter		Conductor Tolerance	Grade 1		Grade 2		Grade 3	
(mm)	swg	(mm)	Minimum Increase (mm)	Maximum Increase (mm)	Minimum Increase (mm)	Maximum Increase (mm)	Minimum Increase (mm)	Maximum Increase (mm)
0.212		0.003	0.015	0.24	0.029	0.254	0.043	0.268
0.213	35	0.003	0.015	0.241	0.029	0.255	0.043	0.269
0.224		0.003	0.015	0.252	0.029	0.266	0.043	0.28
0.234	34	0.004	0.017	0.265	0.032	0.281	0.048	0.296
0.236		0.004	0.017	0.267	0.032	0.283	0.048	0.298
0.25		0.004	0.017	0.281	0.032	0.297	0.048	0.312
0.254	33	0.004	0.018	0.286	0.033	0.303	0.05	0.319
0.265		0.004	0.018	0.297	0.033	0.314	0.05	0.33
0.274	32	0.004	0.018	0.306	0.035	0.323	0.05	0.339
0.28		0.004	0.018	0.312	0.033	0.329	0.05	0.345
0.295	31	0.004	0.019	0.329	0.035	0.347	0.053	0.364
0.3		0.004	0.019	0.334	0.035	0.352	0.053	0.369
0.315		0.004	0.019	0.349	0.035	0.367	0.053	0.384
0.315	30	0.004	0.019	0.349	0.035	0.367	0.053	0.384
0.335		0.004	0.02	0.372	0.038	0.391	0.057	0.408
0.345	29	0.005	0.02	0.382	0.038	0.401	0.057	0.418
0.355		0.004	0.02	0.392	0.038	0.411	0.057	0.428
0.375		0.005	0.021	0.414	0.04	0.434	0.06	0.453
0.376	28	0.005	0.021	0.417	0.04	0.435	0.06	0.454
0.4		0.005	0.021	0.439	0.04	0.459	0.06	0.478
0.417	27	0.005	0.022	0.458	0.042	0.48	0.064	0.5
0.425		0.005	0.022	0.466	0.042	0.488	0.064	0.508
0.45		0.005	0.022	0.491	0.042	0.513	0.064	0.533
0.457	26	0.005	0.024	0.501	0.045	0.523	0.067	0.544
0.475		0.005	0.024	0.519	0.045	0.541	0.067	0.582
0.5		0.005	0.024	0.544	0.045	0.566	0.067	0.587
0.508	25	0.006	0.025	0.554	0.047	0.578	0.071	0.602
0.53		0.006	0.025	0.576	0.047	0.6	0.071	0.623
0.559	24	0.006	0.025	0.605	0.047	0.629	0.071	0.652
0.56		0.006	0.025	0.606	0.047	0.63	0.071	0.653
0.6		0.006	0.027	0.649	0.05	0.674	0.075	0.698
0.61	23	0.006	0.027	0.659	0.05	0.684	0.075	0.708
0.63		0.006	0.027	0.679	0.05	0.704	0.075	0.728
0.67		0.007	0.028	0.722	0.053	0.749	0.08	0.774
0.71		0.007	0.028	0.762	0.053	0.789	0.08	0.814
0.711	22	0.008	0.03	0.766	0.056	0.795	0.085	0.822
0.75		0.008	0.03	0.805	0.056	0.834	0.085	0.861
0.8		0.008	0.03	0.855	0.056	0.884	0.085	0.911
0.813	21	0.009	0.032	0.872	0.06	0.902	0.09	0.931
0.85		0.009	0.032	0.909	0.06	0.939	0.09	0.968
0.9		0.009	0.032	0.959	0.06	0.989	0.09	1.018
0.914	20	0.01	0.034	0.976	0.063	1.008	0.095	1.038

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Conductor Diameter		Conductor Tolerance	Grade 1		Grade 2		Grade 3	
(mm)	swg	(mm)	Minimum Increase	Maximum Increase	Minimum Increase	Maximum Increase	Minimum Increase	Maximum Increase
			(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
0.95		0.01	0.034	1.012	0.063	1.044	0.095	1.074
1		0.01	0.034	1.062	0.063	1.094	0.095	1.124
1.016	19	0.011	0.034	1.08	0.065	1.113	0.098	1.144
1.06		0.011	0.034	1.124	0.065	1.157	0.098	1.188
1.12		0.011	0.034	1.184	0.065	1.217	0.098	1.248
1.18		0.012	0.035	1.246	0.067	1.279	0.1	1.311
1.219	18	0.013	0.035	1.285	0.067	1.318	0.1	1.35
1.25		0.013	0.035	1.316	0.067	1.349	0.1	1.381
1.32		0.013	0.036	1.388	0.069	1.422	0.103	1.455
1.4		0.014	0.036	1.468	0.069	1.502	0.103	1.535
1.422	17	0.015	0.038	1.492	0.071	1.528	0.107	1.562
1.5		0.015	0.038	1.57	0.071	1.606	0.107	1.64
1.6		0.016	0.038	1.67	0.071	1.706	0.107	1.74
1.626	16	0.017	0.039	1.698	0.073	1.735	0.11	1.77
1.7		0.017	0.039	1.772	0.073	1.809	0.11	1.844
1.8		0.018	0.039	1.872	0.073	1.909	0.11	1.944
1.829	15	0.019	0.04	1.903	0.075	1.941	0.113	1.977
1.9		0.019	0.04	1.974	0.075	2.012	0.113	2.048
2		0.02	0.04	2.074	0.075	2.112	0.113	2.148
2.032	14	0.02	0.041	2.108	0.077	2.147	0.116	2.184
2.12		0.021	0.041	2.196	0.077	2.235	0.116	2.272
2.24		0.022	0.041	2.316	0.077	2.355	0.116	2.392
2.337	13	0.024	0.042	2.415	0.079	2.455	0.119	2.493
2.36		0.024	0.042	2.438	0.079	2.478	0.119	2.516
2.5		0.025	0.042	2.578	0.079	2.618	0.119	2.656
2.642	12	0.027	0.043	2.722	0.081	2.764	0.123	2.803
2.8		0.028	0.043	2.88	0.081	2.922	0.123	2.961
2.85		0.027	0.043	2.73	0.081	2.772	0.123	2.811
2.946	11	0.03	0.045	3.029	0.084	3.072	0.127	3.112
3		0.03	0.045	3.083	0.084	3.126	0.127	3.166
3.15		0.032	0.045	3.233	0.084	3.276	0.127	3.316
3.35		0.034	0.046	3.435	0.086	3.479	0.13	3.521
3.55		0.036	0.046	3.635	0.086	3.679	0.13	3.721
3.75		0.038	0.047	3.838	0.089	3.883	0.134	3.926
4		0.04	0.047	4.088	0.089	4.133	0.134	4.176
4.25		0.043	0.049	4.341	0.092	4.387	0.138	4.431
4.5		0.045	0.049	4.591	0.092	4.637	0.138	4.681
4.75		0.048	0.05	4.843	0.094	4.891	0.142	4.936
5		0.05	0.05	5.093	0.094	5.141	0.142	5.186

Notes :

- 1) For intermediate conductor diameter, increase corresponding to the next larger nominal;
- 2) Maximum overall diameter for intermediate conductor size is equal to maximum overall

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The SWG range and the sizes offered by us are way more extensive than the ones studied in this catalogue and can also be developed as per specific requirements .

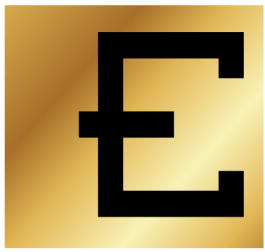
The SWG range and the sizes studied in this catalogue are randomly handpicked and our actual product portfolio offers a complete range .

For more information visit www.emsons.co and get in touch with us at mail@emsons.co

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