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Industrial Cable and Connector Technology

Rating	**MW 28-C SL** **Thermal Class 155°C**
CnC Part Number Series	**610XXX -series, Solder able without removing the overcoat.**
Date of Revision	**11/18/2016**

Part Numbers	**Part Number**	**Description**
	610214	**MW-28C SL 14AWG 1KG/2.2LBS**
	610216	**MW-28C SL 16AWG 1KG/2.2LBS**
	610218	**MW-28C SL 18AWG 1KG/2.2LBS**
	610220	**MW-28C SL 20AWG 1KG/2.2LBS**
	610222	**MW-28C SL 22AWG 1KG/2.2LBS**
	610224	**MW-28C SL 24AWG 1KG/2.2LBS**
	610226	**MW-28C SL 26AWG 1KG/2.2LBS**
	610228	**MW-28C SL 28AWG 1KG/2.2LBS**
	610230	**MW-28C SL 30AWG 1KG/2.2LBS**
	610232	**MW-28C SL 32AWG 1KG/2.2LBS**
	610234	**MW-28C SL 34AWG 1KG/2.2LBS**

Publish	**Approval**	**Examination**	**Issue**
	万永红	刘明胜	黄平

Revision Form

TYPE: MW 28-C SL

DATE	REVISION ITEM
2014.06.17	New publishing
2016.11.18	REV 01

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1. Scope

This Standard specifies thermal class 155 °C MW 28-C SL enameled copper wires to be used in windings and wirings of electric machines and apparatus, electric communication equipment, electronic equipment and electrical instruments.

2. Classes and Symbols

The wires are classified according to the conductor and thickness of film, and the classes and symbols is as Table 1.

Table 1

Class	Symbol
Class Heavy film polyurethane enameled copper wire	MW 28-C HY
Class Single film polyurethane enameled copper wire	MW 28-C SL

3. Thermal Class

TI：155℃

4. Characteristics

The characteristics of the wires shall comply with Table 2, when tested in accordance with 6.

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Table 2

<table>
<tr><td rowspan="2">Test items</td><td rowspan="2" colspan="2">Characteristics</td><td colspan="4">Test Method</td></tr>
<tr><td colspan="3">Test requirements</td><td>Clause Used</td></tr>
<tr><td>Dimensions</td><td colspan="2">Comply with Attached Table 4</td><td colspan="3">——</td><td>6.1</td></tr>
<tr><td rowspan="2">Pinhole</td><td>Heavy Class</td><td>Single Class</td><td colspan="3" rowspan="2">L = 5M</td><td rowspan="2">6.2</td></tr>
<tr><td>3Max</td><td>5Max</td></tr>
<tr><td>Flexibility</td><td colspan="2">The coating shall show no crack on the conductor</td><td>AWG Size</td><td>Elongation</td><td>Mandrel Winding</td><td>6.3</td></tr>
<tr><td colspan="2" rowspan="3"></td><td>14~20</td><td>20%</td><td>3d</td><td rowspan="3"></td></tr>
<tr><td>21~30</td><td>15%</td><td>1d</td></tr>
<tr><td>31~44</td><td>20% (Or to its breaking point, Whichever is less)</td><td>3d</td></tr>
<tr><td>Adhesion</td><td colspan="2">No cracks visible in the film such as to expose the</td><td colspan="3">——</td><td>6.4</td></tr>
<tr><td>Abrasion</td><td colspan="2">Comply with Attached Table</td><td colspan="3">——</td><td>6.5</td></tr>
<tr><td>Breakdown Voltage</td><td colspan="2">Comply with Attached Table4</td><td colspan="3">——</td><td>6.6</td></tr>
<tr><td>Cut through</td><td colspan="2">Not cut through at 170℃, 2min</td><td colspan="3">——</td><td>6.7</td></tr>
</table>

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Continuous Table 2

<table>
<tr><td rowspan="2">Test items</td><td rowspan="2">Characteristics</td><td colspan="4">Test Methods</td></tr>
<tr><td colspan="3">Test requirements</td><td>Clause Used</td></tr>
<tr><td rowspan="4">Heat shock resistance</td><td rowspan="4">No cracks visible in the film such as to expose the conductor</td><td>AWG Size</td><td>Elongation</td><td>Mandrel Winding</td><td rowspan="4">6.8</td></tr>
<tr><td>14~30</td><td>20%</td><td>3</td></tr>
<tr><td>31~44</td><td>20%(Or to its breaking point, whichever is less)</td><td>3
d</td></tr>
<tr><td colspan="3">The specimen shall be heated to175±5℃ in 3d for half an hour</td></tr>
<tr><td>Solvent resistance</td><td>No bubbles or blisters visible in the film, with nail or 2H, film shall not be peeled</td><td colspan="3">Pencil method</td><td>6.9</td></tr>
<tr><td rowspan="6">Solder-ability</td><td rowspan="6">610XXX -series, Solder able without removing the overcoat.</td><td>AWG Size</td><td>Solder Tempera-ture ℃</td><td>Soakage Time</td><td rowspan="6">6.10</td></tr>
<tr><td>14~19</td><td>430℃</td><td>10S</td></tr>
<tr><td>20~23</td><td>430℃</td><td>8S</td></tr>
<tr><td>24~29</td><td>360℃</td><td>6S</td></tr>
<tr><td>30~36</td><td>360℃</td><td>5S</td></tr>
<tr><td>37~44</td><td>360℃</td><td>4S</td></tr>
<tr><td>Conductor Resistance</td><td>Comply with Attached Table4</td><td colspan="3">——</td><td>6.11</td></tr>
<tr><td>Elongation</td><td>Comply with Attached Table4</td><td colspan="3">——</td><td>6.12</td></tr>
<tr><td></td><td></td><td colspan="3"></td><td></td></tr>
</table>

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5. Conductor, Insulating Film and Appearance

5.1 Conductor

The conductor for class-2 shall be copper wire specified in JISC 3103-Annealed
Copper Wires for Windings of Electric Machines.

5.2 Insulating Film

The insulating film of the wire shall be made by baking polyurethane and over coated with polyamide insulating varnish for enameled wires on the conductor uniformly. The film shall be harmless to the conductor and shall have sufficient
durability.

5.3 Appearance

No scratches, to be smooth surface and uniform luster and hue, not sticky, not to be readily scratched off by fingernail Testing Methods. The wire shall be wind the bobbin, no cracks and dirt visible on appearance.

6. Test methods

6.1 Dimensions

This shall comply with 3.2.1.1of NEMA.MW-1000

6.2 Pinhole

This shall comply with 6.1 of JISC 3003

6.3 Flexibility

This shall comply with 3.3.1.1of NEMA.MW-1000

6.4 Adhesion

This shall comply with 3.3.1.1of NEMA.MW-1000

6.5 Resistance to abrasion

This shall comply with 3.59.1.1of NEMA.MW-1000

6.6 Breakdown Voltage

This shall comply with 3.8.1.1.2of NEMA.MW-1000

6.7 Resistance to out through

This shall comply with 3.50.1.1 of
NEMA.MW-1000

6.8 Heat shock resistance

This shall comply with 3.51.1of NEMA.MW-1000

6.9 Solvent resistance

This shall comply with 3.51.1.1of NEMA.MW1000

6.10 Solder-ability

This shall comply with 3.13.1.1of NEMA.MW1000

6.11 Conductor resistance

This shall comply with NEMA.MW1000

6.12 Elongation

This shall comply with 3.4.1.1of NEMA.MW1000

7. Inspection

Inspection shall be made on the following items by the testing methods of 7 (1) Appearance
(2) Dimensions
(3) Pinhole
(4) Flexibility
(5) Adhesion
(6) Resistance to abrasion
(7) Breakdown voltage
(8) Cut through
(9) Heat shock resistance (10) Solvent resistance (11) Solder ability
(12) Conductor resistance
(13) Elongation

8. Packing and Net Weight per coil

8.1Packging

The wire shall be wound, without slackness or tangle, on a bobbin of suitable size according to the conductor diameter - comply with table 3.

8.2 Net Weight per Coil
The net weight per coil shall comply with Table3.

Table 3

Conductor diameter (mm)	Bobbin type	Net weight Per coil (kg)
0.160~0.051 (34#~44#)	PT-4	4+2.0 -3.0
0.361~0.180 (27#~33#)	PT-10	10+2.0 -4.8
0.511~0.404 (24#~26#)	PT-15	15+6.0 -5.0
1.628~0.574 (14#~23#)	PT-25	25+8 -3

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9. Designation of Product

The product shall be designated by the class and conductor diameter, or by the symbol and conductor diameter.
Example: (1) Class Heavy MW 28-C HY enameled copper wire 0.160 (AWG34#) mm color of nature or MW 28-C HY AWG34#
(2) Class Heavy MW28C enameled copper wire 0.160 (AWG34#) mm color of red or MW 28-C HY AWG34#R

10. Marking

The bobbin or container shall be marked at a suitable place with the following items:

(1) Class or symbol
(2) Conductor Diameter
(3) Manufacturing Number
(4) Net weight
(5) Year and month of manufacturing

11. Magnet Wire Test Report
Test report is must when make lot.

12. Keep method and valid time

12.1 Keep Method

(1) Pulling down is not allowed

(2) Beware of collision and fall

(3) Put the goods in dry environment, wet degree: 40%~75%

12.2 Valid time Valid for two years

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Table 4 MW 28-C SL

AWG Size	Diameter (mm)	Conductor Tolerance (mm)	Minimum Film thickness (mm)	Maximum Overall Diam. (mm)	Minimum Dielectric Breakdown Voltage (v)	Minimum Elongation (%)	Maximum Conductor Resistance 20℃ (Ω/KM)	Unit weight in meters (m/kg)
10#	2.588	+0.021/-0.025	0.043	2.660	-	35	3.342	21.4
11#	2.304	+0.018/-0.023	0.043	2.373	-	35	4.219	27.0
12#	2.052	+0.017/-0.020	0.041	2.117	-	34	5.316	34.0
13#	1.829	+0.014/-0.018	0.041	1.892	-	34	6.693	42.8
14#	1.628	+0.015/-0.015	0.041	1.692	3170	33	8.437	54.0
15#	1.450	+0.016/-0.015	0.038	1.509	3090	33	10.66	68.1
16#	1.250	+0.013/-0.012	0.036	1.330	3010	33	14.30	86.1
17#	1.160	+0.012/-0.013	0.036	1.240	2930	31	16.60	108.1
18#	1.000	+0.010/-0.011	0.033	1.070	2850	32	22.40	136.6
19#	0.900	+0.010/-0.010	0.030	0.960	2780	31	27.50	172.2
20#	0.800	+0.007/-0.008	0.030	0.860	2710	30	34.80	216.7
21#	0.720	+0.008/-0.008	0.028	0.780	2640	30	43.00	273.2
22#	0.640	+0.007/-0.008	0.028	0.690	2570	29	54.5	346.4
23#	0.570	+0.005/-0.005	0.025	0.620	2500	29	68.70	434.7
24#	0.510	+0.005/-0.006	0.025	0.560	2440	28	85.90	548.5
25#	0.440	+0.005/-0.005	0.023	0.490	2370	28	115.0	691.8
26#	0.410	+0.005/-0.005	0.023	0.450	2310	27	133.0	877.5
27#	0.350	+0.002/-0.003	0.020	0.390	2250	27	182.0	1099.0
28#	0.330	+0.003/-0.002	0.020	0.370	2200	26	205.0	1398.6
29#	0.290	+0.003/-0.003	0.018	0.330	2140	26	265.0	1738.8
30#	0.250	+0.003/-0.003	0.018	0.275	2140	25	357.0	2219.9
31#	0.230	+0.003/-0.002	0.015	0.255	1840	24	422.0	2804.1
32#	0.210	+0.003/-0.002	0.013	0.235	1840	24	506.4	3475.5
33#	0.180	+0.003/-0.002	0.013	0.200	1530	23	689.0	4420.4
34#	0.160	+0.003/-0.003	0.013	0.180	1530	22	872.0	5594.6
35#	0.140	+0.003/-0.002	0.010	0.160	1220	21	1137	7102.8
36#	0.130	+0.003/-0.003	0.010	0.150	1220	20	1322	8879.8
37#	0.120	+0.003/-0.002	0.008	0.140	1220	20	1551	11020.4
38#	0.100	+0.002/-0.003	0.008	0.120	450	19	2237	13766.0
39#	0.090	+0.002/-0.003	0.005	0.105	450	18	2758	18081.2
40#	0.080	+0.002/-0.003	0.005	0.095	375	17	3487	22948.5
41#	0.070	+0.003/-0.002	0.005	0.085	375	17	4556	28411.3
42#	0.060	+0.002/-0.003	0.005	0.075	350	16	6198	34966.2
43#	0.056	+0.002/-0.003	0.005	0.066	300	15	7815	45670.1
44#	0.051	+0.002/-0.003	0.005	0.061	275	14	9529	55064.0
45#	0.0447	+0.003/-0.003	0.0051	0.0559	250	11	11495	71679.2
46#	0.0399	+0.003/-0.003	0.0051	0.0508	225	10	16122	89962.7