| Rating                  | MW 28-C SL
<table>
<thead>
<tr>
<th></th>
<th>Thermal Class 155°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CnC Part Number Series</td>
<td>610XXX -series, Solder able without removing the overcoat.</td>
</tr>
<tr>
<td>Date of Revision</td>
<td>11/18/2016</td>
</tr>
<tr>
<td><strong>Part Numbers</strong></td>
<td><strong>Part Number</strong></td>
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<tr>
<td>610214</td>
<td>MW-28C SL 14AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610216</td>
<td>MW-28C SL 16AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610218</td>
<td>MW-28C SL 18AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610220</td>
<td>MW-28C SL 20AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610222</td>
<td>MW-28C SL 22AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610224</td>
<td>MW-28C SL 24AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610226</td>
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</tr>
<tr>
<td>610228</td>
<td>MW-28C SL 28AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610230</td>
<td>MW-28C SL 30AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610232</td>
<td>MW-28C SL 32AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td>610234</td>
<td>MW-28C SL 34AWG 1KG/2.2LBS</td>
</tr>
<tr>
<td><strong>Publish</strong></td>
<td><strong>Approval</strong></td>
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<tr>
<td></td>
<td>万永红</td>
</tr>
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</table>
Revision Form

TYPE: MW 28-C SL

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISION ITEM</th>
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<tbody>
<tr>
<td>2014.06.17</td>
<td>New publishing</td>
</tr>
<tr>
<td>2016.11.18</td>
<td>REV 01</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Class</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class Heavy film polyurethane enameled copper wire</td>
<td>MW 28-C HY</td>
</tr>
<tr>
<td>Class Single film polyurethane enameled copper wire</td>
<td>MW 28-C SL</td>
</tr>
</tbody>
</table>

3. Thermal Class

TI: 155°C

4. Characteristics

The characteristics of the wires shall comply with Table 2, when tested in accordance with 6.
<table>
<thead>
<tr>
<th>Test items</th>
<th>Characteristics</th>
<th>Test Method</th>
<th>Test requirements</th>
<th>Clause Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>Comply with Attached Table 4</td>
<td></td>
<td>——</td>
<td>6.1</td>
</tr>
<tr>
<td>Pinhole</td>
<td>Heavy Class</td>
<td>Single Class</td>
<td>L = 5M</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>The coating shall show no crack on the conductor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AWG Size</td>
<td>Elongation</td>
</tr>
<tr>
<td></td>
<td>14~20</td>
<td></td>
<td>20%</td>
<td>3d</td>
</tr>
<tr>
<td></td>
<td>21~30</td>
<td></td>
<td>15%</td>
<td>1d</td>
</tr>
<tr>
<td></td>
<td>31~44</td>
<td></td>
<td>20% (Or to its breaking point, Whichever is less)</td>
<td>3d</td>
</tr>
<tr>
<td>Adhesion</td>
<td>No cracks visible in the film such as to expose the</td>
<td></td>
<td>——</td>
<td>6.4</td>
</tr>
<tr>
<td>Abrasion</td>
<td>Comply with Attached Table</td>
<td></td>
<td>——</td>
<td>6.5</td>
</tr>
<tr>
<td>Breakdown Voltage</td>
<td>Comply with Attached Table4</td>
<td></td>
<td>——</td>
<td>6.6</td>
</tr>
<tr>
<td>Cut through</td>
<td>Not cut through at 170°C 2min</td>
<td></td>
<td>——</td>
<td>6.7</td>
</tr>
</tbody>
</table>
### Continuous Table 2

<table>
<thead>
<tr>
<th>Test items</th>
<th>Characteristics</th>
<th>Test Methods</th>
<th>Test requirements</th>
<th>Clause Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat shock resistance</td>
<td>No cracks visible in the film such as to expose the conductor</td>
<td></td>
<td></td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWG Size</td>
<td>14~30</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elongation</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mandrel Winding</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>31~44</td>
<td>20%(Or to its breaking point, whichever is less)</td>
<td>3 d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The specimen shall be heated to 175±5℃ in 3d for half an hour</td>
<td></td>
<td></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>Pencil method</td>
<td></td>
<td>6.9</td>
</tr>
<tr>
<td>Solder-ability</td>
<td>610XXX -series, Solder able without removing the overcoat.</td>
<td></td>
<td></td>
<td>6.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWG Size</td>
<td>14~19</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Solder Temperature (°C)</td>
<td>430°C</td>
<td>10S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Soakage Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>20~23</td>
<td>430°C</td>
<td>8S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24~29</td>
<td>360°C</td>
<td>6S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30~36</td>
<td>360°C</td>
<td>5S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>37~44</td>
<td>360°C</td>
<td>4S</td>
</tr>
<tr>
<td>Conductor Resistance</td>
<td>Comply with Attached Table4</td>
<td></td>
<td></td>
<td>6.11</td>
</tr>
<tr>
<td>Elongation</td>
<td>Comply with Attached Table4</td>
<td></td>
<td></td>
<td>6.12</td>
</tr>
</tbody>
</table>
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 3.51.1 of NEMA.MW-1000

6.9 Solvent resistance  
This shall comply with 3.51.1.1 of NEMA.MW1000

6.10 Solder-ability  
This shall comply with 3.13.1.1 of NEMA.MW1000

6.11 Conductor resistance  
This shall comply with NEMA.MW1000

6.12 Elongation  
This shall comply with 3.4.1.1 of 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

8.1 Packging  
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 Table 3.

<table>
<thead>
<tr>
<th>Conductor diameter (mm)</th>
<th>Bobbin type</th>
<th>Net weight Per coil (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.160~0.051 (34#~44#)</td>
<td>PT-4</td>
<td>4+2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-3</td>
</tr>
<tr>
<td>0.361~0.180 (27#~33#)</td>
<td>PT-10</td>
<td>10+2.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-4.8</td>
</tr>
<tr>
<td>0.511~0.404 (24#~26#)</td>
<td>PT-15</td>
<td>15+6.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-5.0</td>
</tr>
<tr>
<td>1.628~0.574 (14#~23#)</td>
<td>PT-25</td>
<td>25+8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-3</td>
</tr>
</tbody>
</table>
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
<table>
<thead>
<tr>
<th>AWG Size</th>
<th>Diameter (mm)</th>
<th>Conductor Tolerance (mm)</th>
<th>Minimum Film thickness (mm)</th>
<th>Maximum Overall Diam. (mm)</th>
<th>Minimum Dielectric Breakdown Voltage (v)</th>
<th>Minimum Elongation (%)</th>
<th>Maximum Conductor Resistance 20°C (Ω/KM)</th>
<th>Unit weight in meters (m/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10#</td>
<td>2.588</td>
<td>+0.021/-0.025</td>
<td>0.043</td>
<td>2.660</td>
<td>-</td>
<td>35</td>
<td>3.342</td>
<td>21.4</td>
</tr>
<tr>
<td>11#</td>
<td>2.304</td>
<td>+0.018/-0.023</td>
<td>0.043</td>
<td>2.373</td>
<td>-</td>
<td>35</td>
<td>4.219</td>
<td>27.0</td>
</tr>
<tr>
<td>12#</td>
<td>2.052</td>
<td>+0.017/-0.020</td>
<td>0.041</td>
<td>2.117</td>
<td>-</td>
<td>34</td>
<td>5.316</td>
<td>34.0</td>
</tr>
<tr>
<td>13#</td>
<td>1.829</td>
<td>+0.014/-0.018</td>
<td>0.041</td>
<td>1.892</td>
<td>-</td>
<td>34</td>
<td>6.693</td>
<td>42.8</td>
</tr>
<tr>
<td>14#</td>
<td>1.628</td>
<td>+0.015/-0.015</td>
<td>0.041</td>
<td>1.692</td>
<td>3170</td>
<td>33</td>
<td>8.437</td>
<td>54.0</td>
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<tr>
<td>15#</td>
<td>1.450</td>
<td>+0.016/-0.015</td>
<td>0.038</td>
<td>1.509</td>
<td>3090</td>
<td>33</td>
<td>10.66</td>
<td>68.1</td>
</tr>
<tr>
<td>16#</td>
<td>1.250</td>
<td>+0.013/-0.012</td>
<td>0.036</td>
<td>1.330</td>
<td>3010</td>
<td>33</td>
<td>14.30</td>
<td>86.1</td>
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<tr>
<td>17#</td>
<td>1.160</td>
<td>+0.012/-0.013</td>
<td>0.036</td>
<td>1.240</td>
<td>2930</td>
<td>31</td>
<td>16.60</td>
<td>108.1</td>
</tr>
<tr>
<td>18#</td>
<td>1.000</td>
<td>+0.010/-0.011</td>
<td>0.033</td>
<td>1.070</td>
<td>2850</td>
<td>32</td>
<td>22.40</td>
<td>136.6</td>
</tr>
<tr>
<td>19#</td>
<td>0.900</td>
<td>+0.010/-0.010</td>
<td>0.030</td>
<td>0.960</td>
<td>2780</td>
<td>31</td>
<td>27.50</td>
<td>172.2</td>
</tr>
<tr>
<td>20#</td>
<td>0.800</td>
<td>+0.007/-0.008</td>
<td>0.030</td>
<td>0.860</td>
<td>2710</td>
<td>30</td>
<td>34.80</td>
<td>216.7</td>
</tr>
<tr>
<td>21#</td>
<td>0.720</td>
<td>+0.008/-0.008</td>
<td>0.028</td>
<td>0.780</td>
<td>2640</td>
<td>30</td>
<td>43.00</td>
<td>273.2</td>
</tr>
<tr>
<td>22#</td>
<td>0.640</td>
<td>+0.007/-0.008</td>
<td>0.028</td>
<td>0.690</td>
<td>2570</td>
<td>29</td>
<td>54.50</td>
<td>346.4</td>
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<tr>
<td>23#</td>
<td>0.570</td>
<td>+0.005/-0.005</td>
<td>0.025</td>
<td>0.620</td>
<td>2500</td>
<td>29</td>
<td>68.70</td>
<td>434.7</td>
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<td>24#</td>
<td>0.510</td>
<td>+0.005/-0.006</td>
<td>0.025</td>
<td>0.560</td>
<td>2440</td>
<td>28</td>
<td>85.90</td>
<td>548.5</td>
</tr>
<tr>
<td>25#</td>
<td>0.440</td>
<td>+0.005/-0.005</td>
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<td>0.490</td>
<td>2370</td>
<td>28</td>
<td>115.0</td>
<td>691.8</td>
</tr>
<tr>
<td>26#</td>
<td>0.410</td>
<td>+0.005/-0.005</td>
<td>0.023</td>
<td>0.450</td>
<td>2310</td>
<td>27</td>
<td>133.0</td>
<td>877.5</td>
</tr>
<tr>
<td>27#</td>
<td>0.350</td>
<td>+0.002/-0.003</td>
<td>0.020</td>
<td>0.390</td>
<td>2250</td>
<td>27</td>
<td>182.0</td>
<td>1099.0</td>
</tr>
<tr>
<td>28#</td>
<td>0.330</td>
<td>+0.003/-0.002</td>
<td>0.020</td>
<td>0.370</td>
<td>2200</td>
<td>26</td>
<td>205.0</td>
<td>1398.6</td>
</tr>
<tr>
<td>29#</td>
<td>0.290</td>
<td>+0.003/-0.003</td>
<td>0.018</td>
<td>0.330</td>
<td>2140</td>
<td>26</td>
<td>265.0</td>
<td>1738.8</td>
</tr>
<tr>
<td>30#</td>
<td>0.250</td>
<td>+0.003/-0.003</td>
<td>0.018</td>
<td>0.275</td>
<td>2140</td>
<td>25</td>
<td>357.0</td>
<td>2219.9</td>
</tr>
<tr>
<td>31#</td>
<td>0.230</td>
<td>+0.003/-0.002</td>
<td>0.015</td>
<td>0.255</td>
<td>1840</td>
<td>24</td>
<td>422.0</td>
<td>2804.1</td>
</tr>
<tr>
<td>32#</td>
<td>0.210</td>
<td>+0.003/-0.002</td>
<td>0.013</td>
<td>0.235</td>
<td>1840</td>
<td>24</td>
<td>506.4</td>
<td>3475.5</td>
</tr>
<tr>
<td>33#</td>
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<td>+0.003/-0.002</td>
<td>0.013</td>
<td>0.200</td>
<td>1530</td>
<td>23</td>
<td>689.0</td>
<td>4420.4</td>
</tr>
<tr>
<td>34#</td>
<td>0.160</td>
<td>+0.003/-0.003</td>
<td>0.013</td>
<td>0.180</td>
<td>1530</td>
<td>22</td>
<td>872.0</td>
<td>5594.6</td>
</tr>
<tr>
<td>35#</td>
<td>0.140</td>
<td>+0.003/-0.003</td>
<td>0.010</td>
<td>0.160</td>
<td>1220</td>
<td>21</td>
<td>1137.0</td>
<td>7102.8</td>
</tr>
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<td>36#</td>
<td>0.130</td>
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<td>0.010</td>
<td>0.150</td>
<td>1220</td>
<td>20</td>
<td>1322.0</td>
<td>8879.8</td>
</tr>
<tr>
<td>37#</td>
<td>0.120</td>
<td>+0.003/-0.002</td>
<td>0.008</td>
<td>0.140</td>
<td>1220</td>
<td>20</td>
<td>1551.0</td>
<td>11020.4</td>
</tr>
<tr>
<td>38#</td>
<td>0.100</td>
<td>+0.002/-0.002</td>
<td>0.008</td>
<td>0.120</td>
<td>450</td>
<td>19</td>
<td>2237.0</td>
<td>13766.0</td>
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<td>39#</td>
<td>0.090</td>
<td>+0.002/-0.003</td>
<td>0.005</td>
<td>0.105</td>
<td>450</td>
<td>18</td>
<td>2758</td>
<td>18081.2</td>
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<tr>
<td>40#</td>
<td>0.080</td>
<td>+0.002/-0.003</td>
<td>0.005</td>
<td>0.095</td>
<td>375</td>
<td>17</td>
<td>3487</td>
<td>22948.5</td>
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<tr>
<td>41#</td>
<td>0.070</td>
<td>+0.003/-0.002</td>
<td>0.005</td>
<td>0.085</td>
<td>375</td>
<td>17</td>
<td>4556</td>
<td>28411.3</td>
</tr>
<tr>
<td>42#</td>
<td>0.060</td>
<td>+0.002/-0.003</td>
<td>0.005</td>
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