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|--------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|-------------------|
| <br>Industrial Cable and Connector Technology |                     |                      |                   |
| <b>Standard name</b>                                                                                                           | <b>MW35C</b>        |                      |                   |
| <b>Standard number</b>                                                                                                         | <b>CX14010701</b>   |                      |                   |
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|                                                                                                                                | <b>Yonghong WAN</b> | <b>Mingsheng LIU</b> | <b>Ping HUANG</b> |
|                                                                                                                                |                     |                      |                   |

**Revision form**

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## 1. Scope

This Standard specifies thermal class 200°C MW35C 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 are as Table 1.

Table 1

| Class                                                                             | Symbol   |
|-----------------------------------------------------------------------------------|----------|
| Class Heavy film Polyester over coated with polyamide-imide enameled copper wire  | MW35C HY |
| Class Single film Polyester over coated with polyamide-imide enameled copper wire | MW35C SL |

## 3. Thermal Class

TI : 200°C

## 4. Characteristics

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

Table 2

| Test items        | Characteristics                                               |             | Test Method       |                                                           |                    |             |
|-------------------|---------------------------------------------------------------|-------------|-------------------|-----------------------------------------------------------|--------------------|-------------|
|                   |                                                               |             | Test requirements |                                                           |                    | Clause Used |
| Dimensions        | Comply with Attached Table4                                   |             | ——                |                                                           |                    | 6.1         |
| Pinhole           | Single Class                                                  | Heavy Class | L=5M              |                                                           |                    | 6.2         |
|                   | 5Max                                                          | 3Max        |                   |                                                           |                    |             |
| Flexibility       | The coating shall show no crack on the conductor              |             | AWG Size          | Elonga-<br>tion                                           | Mandrel<br>Winding | 6.3         |
|                   |                                                               |             | 14~20             | 20%                                                       | 3d                 |             |
|                   |                                                               |             | 21~30             | 15%                                                       | 1d                 |             |
|                   |                                                               |             | 31~44             | 20%(Or to its<br>breaking point,<br>whichever is<br>less) | 3d                 |             |
| Adhesion          | No cracks visible in the film such as to expose the conductor |             | ——                |                                                           |                    | 6.4         |
| Abrasion          | Comply with Attached Table                                    |             | ——                |                                                           |                    | 6.5         |
| Breakdown Voltage | Comply with Attached Table4                                   |             | ——                |                                                           |                    | 6.6         |
| Cut through       | Not cut through at 300°C, 2min                                |             | ——                |                                                           |                    | 6.7         |

Continuous Table 2

| Test items            | Characteristics                                                                                                   | Test Methods                                                  |                                                  |                 |             |
|-----------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------|-----------------|-------------|
|                       |                                                                                                                   | Test requirements                                             |                                                  |                 | Clause Used |
| Heat shock resistance | No cracks visible in the film such as to expose the conductor                                                     | AWG Size                                                      | Elong-at ion                                     | Mandrel Winding | 6.8         |
|                       |                                                                                                                   | 14~30                                                         | 20%                                              | 3d              |             |
|                       |                                                                                                                   | 31~44                                                         | 20%(Or to its breaking point, whichever is less) | 3d              |             |
|                       |                                                                                                                   | The specimen shall be heated to220±5°C in 3d for half an hour |                                                  |                 |             |
| Solvent resistance    | No bubbles or blisters visible in the film, with nail or 2H, film shall not be peeled off to expose the conductor | Pencil method                                                 |                                                  |                 | 6.9         |
| Conductor Resistance  | Comply with Attached Table4                                                                                       | ——                                                            |                                                  |                 | 6.10        |
| Elongation            | Comply with Attached Table4                                                                                       | ——                                                            |                                                  |                 | 6.11        |

## 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 3.2.1.1 of NEMA.MW-1000

## 6.2 Pinhole

This shall comply with 6.1 of JISC 3003

## 6.3 Flexibility

This shall comply with 3.3.1.1 of NEMA.MW-1000

## 6.4 Adhesion

This shall comply with 3.3.1.1 of NEMA.MW-1000

## 6.5 Resistance to abrasion

This shall comply with 3.5.1.1 of NEMA.MW-1000

## 6.6 Breakdown Voltage

This shall comply with 3.8.1.1.2 of NEMA.MW-1000

## 6.7 Resistance to cut through

This shall comply with 3.5.1.1 of NEMA.MW-1000

## 6.8 Heat shock resistance

This shall comply with 3.5.1.1 of NEMA.MW-1000

## 6.9 Solvent resistance

This shall comply with 3.5.1.1.1 of NEMA.MW1000

## 6.10 Conductor resistance

This shall comply with NEMA.MW1000

## 6.11 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) Conductor resistance
- (12) Elongation

## 8. Packing and Net Weight per coil

### 8.1 Packing

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

## 9. Designation of Product

The product shall be designated by the class and conductor diameter, or by the symbol and conductor diameter.

Example: Class Heavy MW35C enameled copper wire 0.160(AWG34#) mm color  
of nature

or MW35C HY AWG34#

## 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) SHING SHUN MAGNET WIRE CO., LTD
- (6) 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

## 13.Factory

SHING SHUN MAGNET WIRE CO., LTD  
for CnC TECH, LLC



Table4 MW35C HY

| AW<br>G<br>Size | Diameter<br>(mm) | Conductor<br>Tolerance<br>(mm) | Minimum<br>Film<br>thickness<br>(mm) | Maximu<br>m<br>Overall<br>Diam. | Minimum<br>Dielectric<br>Breakdown<br>Voltage<br>(v) | Minimum<br>Elongation<br>( % ) | Maximum<br>Conductor<br>Resistance<br>20°C (Ω<br>/KM) | Unit weight<br>in meters<br>(m/kg) |
|-----------------|------------------|--------------------------------|--------------------------------------|---------------------------------|------------------------------------------------------|--------------------------------|-------------------------------------------------------|------------------------------------|
| 10#             | 2.588            | +0.021/-0.025                  | 0.086                                | 2.703                           | 6120                                                 | 35                             | 3.342                                                 | 21.4                               |
| 11#             | 2.304            | +0.018/-0.023                  | 0.084                                | 2.418                           | 5940                                                 | 35                             | 4.219                                                 | 27.0                               |
| 12#             | 2.052            | +0.017/-0.020                  | 0.081                                | 2.163                           | 5760                                                 | 34                             | 5.316                                                 | 34.0                               |
| 13#             | 1.829            | +0.014/-0.018                  | 0.081                                | 1.934                           | 5760                                                 | 34                             | 6.693                                                 | 42.8                               |
| 14#             | 1.628            | +0.015/-0.015                  | 0.081                                | 1.732                           | 5690                                                 | 33                             | 8.437                                                 | 54.0                               |
| 15#             | 1.450            | +0.016/-0.015                  | 0.076                                | 1.547                           | 5550                                                 | 33                             | 10.66                                                 | 68.1                               |
| 16#             | 1.290            | +0.013/-0.012                  | 0.074                                | 1.384                           | 5400                                                 | 33                             | 13.44                                                 | 86.1                               |
| 17#             | 1.151            | +0.012/-0.013                  | 0.071                                | 1.240                           | 5260                                                 | 32                             | 16.95                                                 | 108.1                              |
| 18#             | 1.024            | +0.010/-0.011                  | 0.066                                | 1.110                           | 5130                                                 | 32                             | 21.39                                                 | 136.6                              |
| 19#             | 0.912            | +0.010/-0.010                  | 0.064                                | 0.993                           | 4990                                                 | 31                             | 26.98                                                 | 172.2                              |
| 20#             | 0.813            | +0.007/-0.008                  | 0.058                                | 0.892                           | 4870                                                 | 30                             | 33.88                                                 | 216.7                              |
| 21#             | 0.724            | +0.008/-0.008                  | 0.056                                | 0.798                           | 4740                                                 | 30                             | 42.82                                                 | 273.2                              |
| 22#             | 0.643            | +0.007/-0.008                  | 0.053                                | 0.714                           | 4620                                                 | 29                             | 54.44                                                 | 346.4                              |
| 23#             | 0.574            | +0.005/-0.005                  | 0.051                                | 0.642                           | 4500                                                 | 29                             | 67.80                                                 | 434.7                              |
| 24#             | 0.511            | +0.005/-0.006                  | 0.048                                | 0.577                           | 4380                                                 | 28                             | 86.08                                                 | 548.5                              |
| 25#             | 0.455            | +0.005/-0.005                  | 0.046                                | 0.516                           | 4270                                                 | 28                             | 108.4                                                 | 691.8                              |
| 26#             | 0.404            | +0.005/-0.005                  | 0.043                                | 0.462                           | 4160                                                 | 27                             | 137.9                                                 | 877.5                              |
| 27#             | 0.361            | +0.002/-0.003                  | 0.041                                | 0.417                           | 4050                                                 | 27                             | 171.3                                                 | 1099.0                             |
| 28#             | 0.320            | +0.003/-0.002                  | 0.041                                | 0.373                           | 3950                                                 | 26                             | 217.1                                                 | 1398.6                             |
| 29#             | 0.287            | +0.003/-0.003                  | 0.038                                | 0.338                           | 3840                                                 | 26                             | 272.2                                                 | 1738.8                             |
| 30#             | 0.254            | +0.003/-0.003                  | 0.036                                | 0.302                           | 3800                                                 | 25                             | 348.5                                                 | 2219.9                             |
| 31#             | 0.226            | +0.003/-0.002                  | 0.033                                | 0.274                           | 3510                                                 | 24                             | 437.5                                                 | 2804.1                             |
| 32#             | 0.203            | +0.003/-0.002                  | 0.031                                | 0.249                           | 3210                                                 | 24                             | 543.4                                                 | 3475.5                             |
| 33#             | 0.180            | +0.003/-0.002                  | 0.028                                | 0.224                           | 2920                                                 | 23                             | 693.0                                                 | 4420.4                             |
| 34#             | 0.160            | +0.003/-0.003                  | 0.025                                | 0.198                           | 2630                                                 | 22                             | 890.6                                                 | 5594.6                             |
| 35#             | 0.142            | +0.003/-0.002                  | 0.023                                | 0.178                           | 2630                                                 | 21                             | 1120                                                  | 7102.8                             |
| 36#             | 0.127            | +0.003/-0.003                  | 0.020                                | 0.160                           | 2340                                                 | 20                             | 1428                                                  | 8879.8                             |
| 37#             | 0.114            | +0.003/-0.002                  | 0.020                                | 0.145                           | 2050                                                 | 20                             | 1750                                                  | 11020.4                            |
| 38#             | 0.102            | +0.002/-0.003                  | 0.018                                | 0.130                           | 850                                                  | 19                             | 2240                                                  | 13766.0                            |
| 39#             | 0.089            | +0.002/-0.003                  | 0.015                                | 0.114                           | 800                                                  | 18                             | 2968                                                  | 18081.2                            |
| 40#             | 0.079            | +0.002/-0.003                  | 0.015                                | 0.102                           | 750                                                  | 17                             | 3801                                                  | 22948.5                            |
| 41#             | 0.071            | +0.003/-0.002                  | 0.013                                | 0.091                           | 650                                                  | 17                             | 4611                                                  | 28411.3                            |
| 42#             | 0.064            | +0.002/-0.003                  | 0.010                                | 0.081                           | 650                                                  | 16                             | 5900                                                  | 34966.2                            |
| 43#             | 0.056            | +0.002/-0.003                  | 0.010                                | 0.074                           | 600                                                  | 15                             | 7815                                                  | 45670.1                            |
| 44#             | 0.051            | +0.002/-0.003                  | 0.010                                | 0.069                           | 550                                                  | 14                             | 9529                                                  | 55064.0                            |
| 45#             | 0.0447           | +0.003/-0.003                  | 0.0100                               | 0.0610                          | 500                                                  | 11                             | 11495                                                 | 71679.2                            |
| 46#             | 0.0399           | +0.003/-0.003                  | 0.0076                               | 0.0533                          | 425                                                  | 10                             | 16122                                                 | 89962.7                            |

Continuous Table4 MW35C SL

| AW<br>G<br>Size | Diameter<br>(mm) | Conductor<br>Tolerance<br>(mm) | Minimum<br>Film<br>thickness<br>(mm) | Maximum<br>Overall<br>Diam.<br>(mm) | Minimum<br>Dielectric<br>Breakdown<br>Voltage<br>(v) | Minimum<br>Elongation<br>( %) | Maximum<br>Conductor<br>Resistance<br>20°C (Ω<br>/KM) | Unit weight<br>in meters<br>(m/kg) |
|-----------------|------------------|--------------------------------|--------------------------------------|-------------------------------------|------------------------------------------------------|-------------------------------|-------------------------------------------------------|------------------------------------|
| 10#             | 2.588            | +0.021/-0.025                  | 0.043                                | 2.660                               | -                                                    | 3                             | 3.342                                                 | 21.4                               |
| 11#             | 2.304            | +0.018/-0.023                  | 0.043                                | 2.373                               | -                                                    | 3                             | 4.219                                                 | 27.0                               |
| 12#             | 2.052            | +0.017/-0.020                  | 0.041                                | 2.117                               | -                                                    | 3                             | 5.316                                                 | 34.0                               |
| 13#             | 1.829            | +0.014/-0.018                  | 0.041                                | 1.892                               | -                                                    | 3                             | 6.693                                                 | 42.8                               |
| 14#             | 1.628            | +0.015/-0.015                  | 0.041                                | 1.692                               | 3170                                                 | 3                             | 8.437                                                 | 54.0                               |
| 15#             | 1.450            | +0.016/-0.015                  | 0.038                                | 1.509                               | 3090                                                 | 3                             | 10.66                                                 | 68.1                               |
| 16#             | 1.290            | +0.013/-0.012                  | 0.036                                | 1.349                               | 3010                                                 | 3                             | 13.44                                                 | 86.1                               |
| 17#             | 1.151            | +0.012/-0.013                  | 0.036                                | 1.203                               | 2930                                                 | 3                             | 16.95                                                 | 108.1                              |
| 18#             | 1.024            | +0.010/-0.011                  | 0.033                                | 1.077                               | 2850                                                 | 3                             | 21.39                                                 | 136.6                              |
| 19#             | 0.912            | +0.010/-0.010                  | 0.030                                | 0.963                               | 2780                                                 | 3                             | 26.98                                                 | 172.2                              |
| 20#             | 0.813            | +0.007/-0.008                  | 0.030                                | 0.861                               | 2710                                                 | 3                             | 33.88                                                 | 216.7                              |
| 21#             | 0.724            | +0.008/-0.008                  | 0.028                                | 0.770                               | 2640                                                 | 3                             | 42.82                                                 | 273.2                              |
| 22#             | 0.643            | +0.007/-0.008                  | 0.028                                | 0.686                               | 2570                                                 | 2                             | 54.44                                                 | 346.4                              |
| 23#             | 0.574            | +0.005/-0.005                  | 0.025                                | 0.617                               | 2500                                                 | 2                             | 67.80                                                 | 434.7                              |
| 24#             | 0.511            | +0.005/-0.006                  | 0.025                                | 0.551                               | 2440                                                 | 2                             | 86.08                                                 | 548.5                              |
| 25#             | 0.455            | +0.005/-0.005                  | 0.023                                | 0.493                               | 2370                                                 | 2                             | 108.4                                                 | 691.8                              |
| 26#             | 0.404            | +0.005/-0.005                  | 0.023                                | 0.439                               | 2310                                                 | 2                             | 137.9                                                 | 877.5                              |
| 27#             | 0.361            | +0.002/-0.003                  | 0.020                                | 0.396                               | 2250                                                 | 2                             | 171.3                                                 | 1099.0                             |
| 28#             | 0.320            | +0.003/-0.002                  | 0.020                                | 0.356                               | 2200                                                 | 2                             | 217.1                                                 | 1398.6                             |
| 29#             | 0.287            | +0.003/-0.003                  | 0.018                                | 0.320                               | 2140                                                 | 2                             | 272.2                                                 | 1738.8                             |
| 30#             | 0.254            | +0.003/-0.003                  | 0.018                                | 0.285                               | 2140                                                 | 2                             | 348.5                                                 | 2219.9                             |
| 31#             | 0.226            | +0.003/-0.002                  | 0.015                                | 0.254                               | 1840                                                 | 2                             | 437.5                                                 | 2804.1                             |
| 32#             | 0.203            | +0.003/-0.002                  | 0.013                                | 0.231                               | 1840                                                 | 2                             | 543.4                                                 | 3475.5                             |
| 33#             | 0.180            | +0.003/-0.002                  | 0.013                                | 0.206                               | 1530                                                 | 2                             | 693.0                                                 | 4420.4                             |
| 34#             | 0.160            | +0.003/-0.003                  | 0.013                                | 0.183                               | 1530                                                 | 2                             | 890.6                                                 | 5594.6                             |
| 35#             | 0.142            | +0.003/-0.002                  | 0.010                                | 0.163                               | 1220                                                 | 2                             | 1120                                                  | 7102.8                             |
| 36#             | 0.127            | +0.003/-0.003                  | 0.010                                | 0.147                               | 1220                                                 | 2                             | 1428                                                  | 8879.8                             |
| 37#             | 0.114            | +0.003/-0.002                  | 0.008                                | 0.132                               | 1220                                                 | 2                             | 1750                                                  | 11020.4                            |
| 38#             | 0.102            | +0.002/-0.003                  | 0.008                                | 0.119                               | 450                                                  | 1                             | 2240                                                  | 13766.0                            |
| 39#             | 0.089            | +0.002/-0.003                  | 0.005                                | 0.104                               | 450                                                  | 1                             | 2968                                                  | 18081.2                            |
| 40#             | 0.079            | +0.002/-0.003                  | 0.005                                | 0.094                               | 375                                                  | 1                             | 3801                                                  | 22948.5                            |
| 41#             | 0.071            | +0.003/-0.002                  | 0.005                                | 0.084                               | 375                                                  | 1                             | 4611                                                  | 28411.3                            |
| 42#             | 0.064            | +0.002/-0.003                  | 0.005                                | 0.076                               | 350                                                  | 1                             | 5900                                                  | 34966.2                            |
| 43#             | 0.056            | +0.002/-0.003                  | 0.005                                | 0.066                               | 300                                                  | 1                             | 7815                                                  | 45670.1                            |
| 44#             | 0.051            | +0.002/-0.003                  | 0.005                                | 0.061                               | 275                                                  | 1                             | 9529                                                  | 55064.0                            |
| 45#             | 0.0447           | +0.003/-0.003                  | 0.0051                               | 0.0559                              | 250                                                  | 1                             | 11495                                                 | 71679.2                            |
| 46#             | 0.0399           | +0.003/-0.003                  | 0.0051                               | 0.0508                              | 225                                                  | 1                             | 16122                                                 | 89962.7                            |