

 CnC Tech Industrial Cable and Connector Technology			
Standard name	MW35C		
Standard number	CX14010701		
Date of publish	01/01/2014		
Date of Revision			
Approved			
Publish	Approval	Examination	Issue
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Revision form

TYPE: MW35C

CODE: CX14010701

DATE	REVISION ITEM
2014.01.01	New publishing

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 is 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			Clause Used
			Test requirements			
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	Elongation	Mandrel Winding	6.3
			14~20	20%	3d	
			21~30	15%	1d	
			31~44	20%(Or to its breaking point, whichever is 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			Clause Used
		Test requirements			
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 to $220\pm 5^{\circ}\text{C}$ 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 3.59.1.1 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 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 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 (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

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 G Size	Diameter (mm)	Conductor Tolerance (mm)	Minimum Film thickness (mm)	Maximum Overall Diam.	Minimum Dielectric Breakdown Voltage (v)	Minimum Elongation (%)	Maximum Conductor Resistance 20°C (Ω /KM)	Unit weight in meters (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

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°C (Ω /KM)	Unit weight in meters (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