TAI-I ELECTRIC WIRE&CABLE CO., LTD.

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SPECIALIZING IN MANUFACTURING OF
VARIOUS OF MAGNET WIRES

NO 25 TA TUNG ROAD
FENGSHAN,HUKOU.
HSINCHU HSIEN,TAIWAN,
R.O.C

REGISTERED

TRADE MARK

Spec NO:2015015
Date:JUL.07.2015

SPECIFICATION

FOR

UEW

Polyurethane Enameled copper wire

Applicable Standard :IEC 60317-4
JIS C 3216

Submitted by

Approved by

TAI-I ELECTRIC WIRE&CABLE CO., LTD.

Mu-ming Huang
Chief of Technical Division

1. Scope

This Standard specifies ***UEW*** 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 shall be as Table 1.

Table 1

Grade	Symbol	Size (mm)
Grade 2 UEW enameled copper wire	Gr2 UEW	0.05～2.24
Grade 3 UEW enameled copper wire	Gr3 UEW	0.05～2.24

3. Thermal Class

UL approved NO E85640

TI：130℃

4. Characteristics

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

Table 2

<table>
<tr><th rowspan="2">No</th><th rowspan="2">Test items</th><th rowspan="2" colspan="3">Characteristics</th><th colspan="3">Test Methosd</th></tr>
<tr><th colspan="2">Test requirements</th><th>Clause used</th></tr>
<tr><td>1</td><td>Dimensions</td><td colspan="3">Comply with Attached Table 5</td><td colspan="2">———</td><td>6.2</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">Pin hole</td><td></td><td>Grade 2</td><td>Grade 3</td><td colspan="2" rowspan="2">L=6M</td><td rowspan="2">6.3</td></tr>
<tr><td></td><td>3 Max.</td><td>2 Max.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">Flexibility</td><td rowspan="2" colspan="3">The coating shall show no crack on the conductor</td><td>Nominal Diameter (mm)</td><td>Mandrel Winding</td><td rowspan="2">6.4</td></tr>
<tr><td>0.05~1.60</td><td>1D</td></tr>
<tr><td>4</td><td>Adhesion</td><td colspan="3">The coating shall show no crack on the conductor</td><td colspan="2">____</td><td>6.5</td></tr>
</table>

No	Test items	Characteristics	Test Method		
			Test requirements		Clause used
5	Resistance to abrasion	Comply with IEC 60317-0-1 Table 2	_____		6.6
6	Breakdown Voltage	Comply with Attached Table 5	_____		6.7
7	Cut through	170℃ Min	No failure shall occur within 2 min.		6.8
8	Heat shock resistance	The Coating shall show no crack on the conductor	Nominal diameter(mm)	Stretched or mandrel	6.9
			0.05~1.60	Comply with IEC 60317-0-1	
			Heated 1/2Hr at 155±5℃		
9	Continuity	Comply with IEC 60317-0-1	The number of faults per 30m of wire shall net exceed the values given in Table3		6.10
10	Conductor Resistance	Comply With Attached Table 5	_____		6.11
11	Elongation	Comply With Attached Table 5	_____		6.12
12	Springiness	Comply With Attached Table 5	_____		6.13
13	Solderability	375±5℃	_____		6.14

5. Conductor, Insulating Film and Appearance

5.1 Conductor

The conductor shall be copper wire specified in JIS C 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 insulating varnish for enamelled wires on the conductor uniformly and perfectly. The film shall be harmless to the conductor and shall have sufficient durability.

6. Testing Methods

6.1 Appearance

This shall comply with JIS C 3216 Testing Methods for Enamelled Copper and Aluminum wires.

6.2 Dimensions

This shall comply with the R20 and R40 Table of IEC 60317-0-1

6.3 Pinhole

This shall comply with 7 of JIS C3216--5.

6.4 Flexibility

This shall comply with 8 of IEC 60317-4.

6.5 Adhesion

This shall comply with 8 of IEC 60317-4.

6.6 Resistance to abrasion

This shall comply with 11 of IEC 60317-4.

6.7 Breakdown Voltage

This shall comply with 13 of IEC 60317-4.

6.8 Cut through

This shall comply with 10 of IEC 60317-4.

6.9 Heat shock resistance

This shall comply with 9 of IEC 60317-4.

6.10 Continuity

This shall comply with 14 of IEC 60317-4.

Continuity of insulation (nominal conductor diameters up to and including 1,600 mm)

The number of faults per 30m of wire shall not exceed the values given in table 3.

Table 3 – Continuity of insulation

Nominal conductor Diameter Mm		Maximum number of faults Per 30m		
Over	Up to and including	Grade 1 and grade 1B	Grade 2 and grade 1B	Grade 3
-	0.050	60	24	-
0.050	0.080	60	24	3
0.080	0.125	40	15	3
0.125	1.600	25	5	3

6.11 Conductor resistance

This shall comply with 5 of IEC 60317-4.

6.12 Elongation

This shall comply with 6 of IEC 60317-4.

6.13 Springiness

This shall comply with 7 of IEC 60317-4.

6.14 Solderability

This shall comply with 17 of IEC 60317-4.

7. Inspection

Inspection shall be made on the following items by the testing methods of 6.

(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) Continuity of insulation
(11) Conductor resistance
(12) Elongation
(13) Springiness
(14) Solderability

8. Packaging and Net Weight per coil

8.1 Packaging

The wire shall be wound, without slackness or tangle, on a bobbin of suitable size according to the conductor diameter, or shall be coiled in a container of suitable size without tangle , and shall be suitably packaged so as not to be damaged or entangled in transportation.

8.2 Net Weight per Coil

The net weight per coil shall comply with Table 4.

Table 4

Conductor diameter (mm)	Bobbin type	Net weight Per coil (kg)	Take up mininum weight
0.05～0.15	PT-4	4±1	0.8
0.10～0.32	PT-10	10±5	4
0.16～0.35	PT-15	15±5	8
0.35～2.24	PT-25	25±7	18
0.50～2.24	PT-90	90±15	50

9. Designation of Product

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

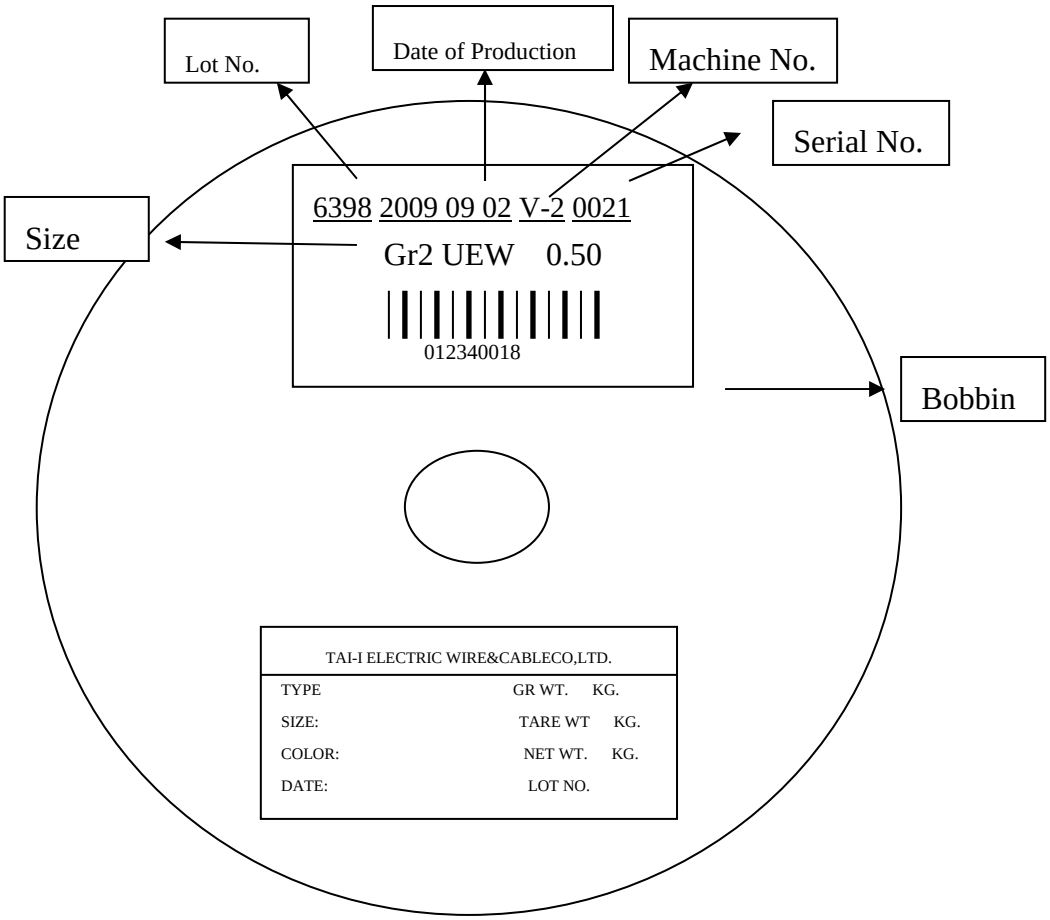
Example：Grade 2 UEW enameled copper wire 0.50mm or

Gr2 UEW 0.50mm

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) Manufacturer‘s name or mark
(6) Year and month of manufacturing



TAI-I ELECTRIC WIRE&CABLECO,LTD.	
TYPE:Gr2 UEW	GR WT. 26.95 KG.
SIZE: 0.500	TARE WT 0.78 KG.
COLOR:N	NET WT. 26.17 KG.
DATE: 12/19/09	
NO 31019965	

IF THERE IS ANY QUESTIONS OCCURRED ON WIRES , PLEASE SUBMIT THESE TWO LABELS TO US FOR FURTHER INVESTIGATION. THANKS.

OBMW2 MAY 16,2003

Magnet Wire-Component **E85640**

TAI-I ELECTRIC WIIRE&CABLE CO LTD
10TH FL 129 MING SHENG EAST RD、SEC 3 TAIPEI TAIWAN

Mtl	**Coat Typ**		**ANSI**	
Dsg	BC	OC	Type(+)	TI℃
UEWE	Polyurethane	Polyamide	**MW28C**	**130**
UEW	Polyurethane		**MW75C**	**130**
PEW	Polyester	---	**MW5C**	**155**
PEWN	Polyester	Polyamide	**MW24C**	**155**
FTW	Polyester	---	**MW5C**	**155**
FTW E	Polyester	Polyamide	**MW24C**	**155**
EIW	Polyester-imide	---	**MW30C**	**180**
EIW.H	Polyester-imide	Polyamide-imide	**MW35C**	**200**
DFW F	Polyester-imide	Polyamide-imide	**MW73C**	**200**
AIW	Polyamide-imide	---	**---**	**220**
UEWF-E	Polyurethane	Polyamide	**MW80C**	**155**
UEWF	Polyurethane	---	**MW79C**	**155**
UEWB	Polyurethane	---	**MW75C**	**130**
AIW-C	Polyamide-imide	---	**---**	**220**
EIWHA	Polyester(amide)(imide)	Polyamide-imide	**MW35C**	**200**
FTWH	Polyester(amide) (imide)	Polyamide-imide	**MW35C** **MW73C**	**200**
SMEIW	Polyester-imide	---	**MW77C**	**180**

	Basecoat	**Middlecoat**	Topcoat	**ANSI(Type+)**	**Temp℃**
FBWHA **FBWHC**	Polyester-imide	Polyamide-imide	Polyamide	**---**	**200**

Attached Table 5- Dimension Table of *UEW* (IEC)

Conductor		Grade 3 (Gr3 *UEW*)		Grade 2 (Gr2 *UEW*)		Dielectric Breakdown (V) ・		Maximum conductor resistance Ω/m (20℃)	Elongation %	Springiness ≦0	
Diameter (mm)	Tolerance (mm)	Minimum Increase due to The Insulation (mm)	Maximum overall diamter (mm)	Minimum Increase due to The Insulation (mm)	Maximum overall diamter (mm)	Grade 3	Grade 2			Grade 3	Grade 2
0.05	± 0.003	0.014	0.072	0.012	0.066	830	600	9.489	10	—	—
0.056	± 0.003	0.015	0.081	0.012	0.074	890	650	7.565	10	—	—
0.06	± 0.003	0.016	0.085	0.012	0.080	1020	700	6.756	12	—	—
0.071	± 0.003	0.018	0.098	0.012	0.091	1100	700	4.747	13	—	—
0.080	± 0.003	0.020	0.108	0.014	0.101	1200	850	3.703	14	100	80
0.090	± 0.003	0.022	0.120	0.015	0.113	1300	900	2.900	15	94	77
0.010	± 0.003	0.023	0.132	0.016	0.125	1400	950	2.333	16	90	73
0.110	± 0.003	0.026	0.145	0.017	0.137	3900	2700	1.917	17	88	73
0.112	± 0.003	0.026	0.147	0.017	0.139	3900	2700	1.735	17	88	73
0.120	± 0.003	0.028	0.157	0.019	0.147	4100	2800	1.604	17	84	70
0.130	± 0.003	0.030	0.169	0.021	0.160	4200	3000	1.361	18	79	67
0.140	± 0.003	0.030	0.181	0.021	0.171	4200	3000	1.170	18	79	67
0.150	± 0.003	0.033	0.193	0.023	0.182	4400	3200	1.016	19	79	67
0.160	± 0.003	0.033	0.205	0.023	0.194	4400	3200	0.890	19	78	67
0.170	± 0.003	0.036	0.217	0.025	0.205	4700	3300	0.787	20	75	65
0.180	± 0.003	0.036	0.229	0.025	0.217	4700	3300	0.701	20	75	65
0.190	± 0.003	0.039	0.240	0.027	0.228	5100	3500	0.628	21	72	62

0.200	± 0.003	0.039	0.252	0.027	0.239	5100	3500	0.566	21	72	62
0.210	± 0.003	0.043	0.264	0.027	0.252	5200	3700	0.512	21	68	59
0.224	± 0.003	0.043	0.280	0.029	0.266	5200	3700	0.434	21	68	59
0.230	± 0.004	0.045	0.278	0.029	0.274	5500	3900	0.430	22	65	56
0.250	± 0.004	0.048	0.312	0.032	0.297	5500	3900	0.363	22	65	56
0.270	± 0.004	0.050	0.334	0.033	0.319	5800	4000	0.310	22	61	53
0.280	± 0.004	0.050	0.345	0.033	0.329	5800	4000	0.278	22	61	53
0.290	± 0.004	0.053	0.356	0.034	0.340	6100	4100	0.268	22	61	53
0.310	± 0.004	0.053	0.379	0.035	0.362	6100	4100	0.234	23	62	55
0.320	± 0.004	0.055	0.391	0.035	0.372	6400	4300	0.220	23	59	53
0.330	± 0.004	0.057	0.403	0.037	0.386	6400	4300	0.207	23	59	53
0.340	± 0.004	0.057	0.413	0.038	0.396	6400	4300	0.194	23	59	53
0.350	± 0.004	0.057	0.423	0.038	0.406	6400	4300	0.183	23	59	53
0.370	± 0.005	0.060	0.445	0.039	0.429	6800	4400	0.165	24	55	50
0.400	± 0.005	0.060	0.478	0.040	0.459	6800	4400	0.141	24	55	50
0.450	± 0.005	0.064	0.533	0.042	0.513	6800	4400	0.111	25	53	48
0.500	± 0.005	0.067	0.587	0.045	0.566	7000	4600	0.090	25	51	47
0.550	± 0.006	0.071	0.643	0.047	0.620	7000	4600	0.074	26	48	44
0.560	± 0.006	0.071	0.653	0.047	0.630	7000	4600	0.0715	26	48	44
0.600	± 0.006	0.075	0.698	0.050	0.674	7100	4800	0.062	27	53	50
0.630	± 0.006	0.075	0.728	0.050	0.704	7100	4800	0.05638	27	53	50
0.700	± 0.007	0.080	0.804	0.053	0.779	7100	4800	0.046	28	50	47
0.710	± 0.007	0.080	0.814	0.053	0.789	7100	4800	0.044	28	50	47

0.800	± 0.008	0.085	0.911	0.056	0.884	7400	4900	0.035	28	46	43
0.850	± 0.009	0.090	0.968	0.060	0.939	7600	5000	0.031	28	51	48
0.900	± 0.009	0.090	1.018	0.060	0.989	7600	5000	0.028	29	51	48
1.000	± 0.010	0.095	1.124	0.063	1.094	7600	5000	0.022	30	47	45
1.060	± 0.011	0.098	1.188	0.065	1.157	7600	5000	0.01995	30	47	45
1.100	± 0.011	0.098	1.228	0.065	1.197	7600	5000	0.018	30	43	41
1.120	± 0.011	0.098	1.248	0.065	1.217	7600	5000	0.01785	30	43	41
1.151	± 0.012	0.100	1.280	0.065	1.250	7600	5000	0.0164	30	43	41
1.180	± 0.012	0.100	1.311	0.067	1.279	7600	5000	0.0156	31	43	41
1.200	± 0.012	0.100	1.331	0.067	1.299	7600	5000	0.0151	31	39	37
1.250	± 0.013	0.100	1.381	0.067	1.349	7600	5000	0.0143	31	39	37
1.290	± 0.013	0.103	1.424	0.067	1.392	7600	5000	0.0131	31	39	37
1.300	± 0.013	0.103	1.434	0.069	1.402	7600	5000	0.0129	32	39	37
1.400	± 0.014	0.103	1.535	0.069	1.502	7600	5000	0.0111	32	36	34
1.500	± 0.015	0.107	1.840	0.071	1.606	7600	5000	0.0097	32	36	34
1.600	± 0.016	0.107	1.740	0.071	1.706	7600	5000	0.0085	32	32	30
1.800	± 0.018	0.110	1.944	0.073	1.909	7600	5000	0.006913	32	—	—
2.000	± 0.020	0.113	2.148	0.075	2.112	7600	5000	0.0056	33	—	—
2.240	± 0.022	0.116	2.392	0.077	2.355	7600	5000	0.004422	33	—	—