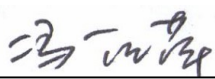
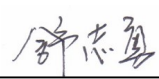


PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	1/8
	REVISION	Aug,01,2020	REVISION NO.	1

PRODUCT NAME : STW-B
RATING : 130°C, 1000V rms

No.	Revised Date	Revised Details	Page	Report
1	Aug,01, 2020	Emendation of Specification	All	-

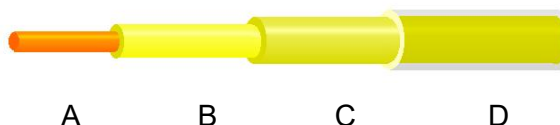
REPORTED BY :  <hr/> Q.C Assistant Manager JiePing Feng	APPROVED BY :  <hr/> Q.C Manager ZhiYong Shu
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PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	2/8
	REVISION	Aug,01,2020	REVISION NO.	1

1. APPLICATIONS

This specification is to be applied for Triple Insulated Winding Wire (STW-B; hereinafter referred to as the "wire") using the winding or the wiring such as electrical machine and electrical apparatus.

2. STRUCTURE



A. Conductor	: Annealed copper
B. 1st Extruded Insulation	: PET type resin
C. 2nd Extruded Insulation	: PET type resin
D. 3rd Extruded Insulation	: Polyamide compound

2.1 CONDUCTOR

The conductor shall be used the annealed copper wire specified in KS C 3101⁻¹⁹⁹⁵ or JIS C 3102⁻¹⁹⁸¹.

2.2 INSULATION

The insulation covering shall consist of triple extruded layer (1st and 2nd layer: polyester type resin, 3rd layer: thermally reinforced polyamide) which are at least equivalent thereto in quality, extruded on the surface of the conductor uniformly. The insulation layers so applied shall have no detrimental effect to the conductor and shall show no flaws or dirt. Further, the wires shall be such that the soldering is possible without removing of the insulation layer. The wire shall be satisfied with B rated (130 °C) thermal index of IEC 172 and UL SUBJECT 2353 test condition.

2.3 COLOR

The color of the wire is basically yellow. Other colors are available on request.

3. CHARACTERISTICS

The characteristics of wire shall be satisfied with Appendix 2 value accordance with the requirements for Section 4. Other requirement of characteristics than those covered by this specification shall be as given in IEC 60950 3rd edition⁻¹⁹⁹⁹ (Safety of information technology equipment including electrical business equipment) sub-clause 2.10.5.4 and Annex U. The rating voltage shall be 1,000Vrms and the insulation grade shall be the reinforced (withstand test voltage 3,000Vrms for 1min).

PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	3/8
	REVISION	Aug,01,2020	REVISION NO.	1

4. TEST

4.1 Appearance

Each winding wire shall be examined for scratch, contamination, crack and other harmful defects on the insulation by visual examination.

4.2 Dimension

The wire shall be measured the conductor diameter, insulation thickness and outer diameter as specified in KS C 3006⁻¹⁹⁸⁶, 5 or JIS C 3003⁻¹⁹⁸⁴, 5.

4.3 Spark Test

Final product shall be subjected to the spark test in accordance with the requirements for UL1581 Section 900. The test shall be performed at 3,000 Vrms.

4.4 Flexibility Test

Three samples are taken from a same lot of wire prepared in the manner described in below and tested at room temperature.

A straight piece of wire at least 305 mm (12 inches) long is to be wound for 10 continuous carefully and adjacent turns around a polished mandrel of the diameter specified in Table 1. After winding, the specimen is to be examined for exposure of the base conductor or delamination by visual examination. There shall be no exposure of bare conductor, or delamination of the insulation.

After visual examination of the specimen, the sample is to be wound on the mandrel and subjected to electric strength tests at 3,000V for 1 min. The voltage shall be applied between the conductor and the mandrel.

Table 1 Mandrel diameter

Nominal conductor diameter		Mandrel diameter, mm (inch)	
mm	inch	mm \pm 0.2 mm	inch \pm 0.01 inch
0.20~0.34	0.008~0.014	4.0	0.16
0.35~0.49	0.014~0.019	6.0	0.24
0.50~0.74	0.019~0.029	8.0	0.31
0.75~1.00	0.029~0.039	10.0	0.39

4-5. Dielectric Breakdown Voltage Test

Three samples are taken from a same Lot of wire prepared in the manner described in below and tested at room temperature.

PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	4/8
	REVISION	Aug,01,2020	REVISION NO.	1

A straight piece of the final wire construction, approximately 400 mm (16 inches) in length, with the insulation removed at both ends, is to be twisted back on itself for a distance of 125 ± 5 mm (5 ± 0.2 inches) with a load applied to the wire pair, and with the number of twists, as provided in loads applied to the wire pairs and number of twists, see Table 2.

The loop at the end of the twisted section is to be cut at two places to provide a maximum spacing between the cut ends. The wire is to be subjected to a test voltage, substantially sine-wave in form, having a frequency of 60 Hz. The voltage applied between the conductors of the wires shall be raised from zero to the prescribed voltage at a rate of 500 V per second and measure the breakdown voltage.

Table 2 Loads applied to the wire and number of twists

Nominal conductor diameter				Load		Number of twists
Over		Up to an including		N	(lbf)	
mm	inch	mm	inch			
0.100	0.004	0.250	0.009	0.85	0.19	33
0.250	0.009	0.355	0.014	1.70	0.38	23
0.355	0.014	0.500	0.019	3.40	0.76	16
0.500	0.019	0.710	0.027	7.00	1.57	12
0.710	0.027	1.060	0.041	13.50	3.03	8
1.060	0.041	1.400	0.055	27.00	6.06	6
1.400	0.055	2.000	0.078	54.00	12.14	4
2.000	0.078	2.500	0.098	108.00	24.27	3

4.6 Withstand Voltage

Two layered and three layered specimens are taken from a same Lot of wire prepared in the manner described in 4.5 Dielectric Breakdown Voltage Test and tested at room temperature.

Two layered wire shall be tested at 6,000V for 1 min and three layered wire shall be tested at 7,000V for 1 min.

4.7 Heat Shock Test

Three samples are taken from a same Lot of wire prepared in the manner described in below and tested at room temperature.

A straight piece of wire at least 305 mm (12 inches) long is to be wound for 10 continuous and adjacent turns around a polished mandrel of the diameter specified in the Table 2. The specimen is placed into an oven with forced air circulation for a period of 30 minutes and at a temperature within 5°C (9°F) of the temperature specified in Table 3. After removal from the oven, the specimen is to be allowed to cool to room temperature, and after cooling is to be examined for cracks under a magnification level (wire diameter 0.04~0.50, magnification level 5~10; wire diameter up to 0.5, magnification level 0~6).

After visual examination of the specimen, the sample is to be wound on the mandrel and subjected to electric strength tests at 3,000V for 1 min. The voltage shall be applied between the conductor and the mandrel.

PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	5/8
	REVISION	Aug,01,2020	REVISION NO.	1

Table 3 Oven temperature

Thermal Class	A (105 class)	E (120 class)	B (130 class)	F (155 class)	H (180 class)
Oven temperature (°C)	200 (392)	215 (419)	225 (437)	240 (464)	260 (560)

4.8 Solvent Resistance Test

A straight piece of wire at least 200 mm (78.5 inches) long is to be thermally aged in an oven at 225 for 10 minutes. After removal from the oven, the sample is to immerse in xylene at 60 ± 3 for 30 minutes and then the specimen is to be examined for bubble or swelling on the insulation by visual examination.

Additionally, after visual examination of the specimen, the sample is to be scraped using the specified hardness of pencil lead. After test the sample is to be examined the crack through which conductor is visible by naked eye.

4.9 Solderability Test

Three straight samples are taken at random from a same Lot of wire at least 150 mm (59 inches) long are immersed in a solder melt (Sn96.5/Ag3.0/Cu0.5) at 420 ± 5 °C during the specified in Table 4. After removal from the solder melt, the specimen is to be allowed to clean using a soft dry cloth, and after cleaning is to be examined for adhesion uniformity by visual examination except the 10 mm immersed ends of specimen.

Table 4 Dipping time of Solderability Test

Conductor diameter (mm)	Dipping time (second)
0.20 ~ 0.40	4
0.45 ~ 0.70	6
0.75 ~ 1.00	10

5. INSPECTION

Inspection of final product shall be satisfied with Appendix 2 value accordance with the requirements for Section 4. The inspection items shall be added or omitted by customer's demand.

6. PACKAGING

The wires shall be wound on suitable bobbin without loosen and tangle according to the conductor diameter (Appendix 1) and adequately packaged to avoid scratch or tangle during transportation. The packaged products shall be possible to permit 6 open-joint and if there is insufficient standard packaging length available to fill additional ones. However, the additional quantity shall not exceeding 30% of total supply quantity.

PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	6/8
	REVISION	Aug,01,2020	REVISION NO.	1

7. TAG of PRODUCT

Each product is attached with a tag to indicate following information

- 1) Product name or Symbol : Triple insulated Wire or STW-B
- 2) Conductor diameter : 0.50 mm
- 3) Color
- 4) Product Lot No.
- 5) Quantity or Product length
- 6) Manufacturer
- 7) Date of manufacture

8. CAUTION of HANDLE

- 1) Always keep product away from the fire.
- 2) Do not expose the product direct sunlight area.
- 3) Also be carefully not to expose the product hot or humidity area.
- 4) The relevant products shall be applied within one year. If not applied for within one year, the product performance shall be confirmed before using the product.

9. Entire Agreement & Amendments

- 1) This Specification shall come into force as of the date of its agreement by the customer or one month after offered to customer and effect until terminated in customer's demands.
- 2) Amendments or changes to this Specification shall be valid only if made in writing and signed by an authorised signatory of each of the Parties.

PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	7/8
	REVISION	Aug,01,2020	REVISION NO.	1

Appendix 1 Specification of Wire

Dimensions					Break Down Voltage	Maximum Conductor Resistance	Weight
Conductor		Insulation					
Diameter	Tolerance	Min. Insulation Thickness	Typical Overall Diameter	Max. Overall Diameter			
(mm)	(mm)	(mm)	(mm)	(mm)	(V)	(Ω/km)	(kg/km)
0.150	± 0.008	0.084	0.380	0.420	7,000	607.6	0.3736
0.20	± 0.008	0.084	0.380	0.420	7,000	607.6	0.3736
0.25	± 0.008	0.084	0.430	0.470	7,000	382.5	0.5475
0.30	± 0.010	0.084	0.480	0.540	7,000	262.9	0.7761
0.32	± 0.010	0.084	0.500	0.560	7,000	230.0	0.8703
0.35	± 0.010	0.084	0.530	0.590	7,000	191.2	1.0220
0.37	± 0.010	0.084	0.550	0.610	7,000	170.6	1.1301
0.40	± 0.010	0.084	0.600	0.660	7,000	145.3	1.3276
0.45	± 0.010	0.084	0.650	0.710	7,000	114.2	1.6454
0.50	± 0.010	0.084	0.700	0.760	7,000	91.43	1.9981
0.55	± 0.020	0.084	0.750	0.810	7,000	78.15	2.3857
0.60	± 0.020	0.084	0.800	0.860	7,000	65.26	2.8082
0.65	± 0.020	0.084	0.850	0.910	7,000	55.31	3.2657
0.70	± 0.020	0.084	0.900	0.960	7,000	47.47	3.7580
0.75	± 0.020	0.084	0.950	1.010	7,000	41.19	4.2853
0.80	± 0.020	0.084	1.000	1.060	7,000	36.08	4.8475
0.85	± 0.020	0.084	1.050	1.110	7,000	31.87	5.4446
0.90	± 0.020	0.084	1.100	1.160	7,000	28.35	6.0766
0.95	± 0.020	0.084	1.150	1.210	7,000	25.38	6.7435
1.00	± 0.020	0.084	1.200	1.260	7,000	23.33	7.4453

PRODUCT SPECIFICATION	ISSUED DATE	Aug, 01,2020	PAGE	8/8
	REVISION	Aug,01,2020	REVISION NO.	1

Appendix 2 Summary of the test specification

Test Item	Property	Related Standard
Appearance	Shall not have scratch, contamination or crack on the surface and other harmful defects.	KS C 3006-1986, 4. JIS C 3003-1984, 4.
Dimensions	Shall be satisfied with Appendix 1.	KS C 3006-1986, 5.(1) JIS C 3003-1984, 5.(1) (TEST 4 of IEC 60851-2-1996, 3)
Spark Test	No pinhole at 3,000V with 3 layered wire (final product)	UL1581 section 900 (IEC60950-1999, 3rd Annex U.3.1)
Break Down Voltage	Shall be satisfied with Appendix 1.	UL SUBJECT 2353-2000, 9
Withstand Voltage	Shall be withstand without breakdown at 3,000V for 1min with 2 layered wire	UL SUBJECT 2353-2000, 9
	Shall be withstand without breakdown at 7,000V for 1min with 3 layered wire	
Flexibility	Specimens shall not show evidence of cracking.	UL SUBJECT 2353-2000, 10
	Shall be no insulation breakdown at 3,000V for 1 min.	
Heat shock	Specimens shall not show evidence of cracking.	UL SUBJECT 2353-2000, 11
	Shall be withstand without breakdown at 3,000V for 1min.	
Solvent Resistance	Shall not have bubble or swelling on the insulation surface	KS C 3006-1986, 14. JIS C 3003-1984, 14
Solderability	Solder shall adhere to the conductor uniformly.	KS C 3006-1986, 16. JIS C 3003-1984, 16.
Conductor Resistance	Shall be satisfied with Appendix 1.	KS C 3101-1995 JIS C 3102-1981