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SPECIFICATION FOR TELECOMMUNICATION DROP WIRE

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Kenwest Cables Ltd.
Consumer Information Network
Jomo Kenyatta University of Science and Technology
SGS(K)
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FOREWORD

This Kenya Standard has been prepared by the Conductors and Cables Technical Committee, under the direct supervision of the Electrical Industry Standards Committee, and it is in accordance with the procedures of the Bureau.

The standard specifies the requirements for prepayment split metering communication cable (Telephone Drop wire).

In the preparation of this Kenya Standard, assistance was derived from Kenya Power TSP 05-034. Acknowledgement is made for the assistance derived from this source.

PUBLIC REVIEW DRAFT

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Contents

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SPECIFICATION FOR TELECOMMUNICATION DROP WIRE

1 Scope

1.1 This specification covers telecommunication drop wires designed for use in wiring of telecommunication equipment or industrial and consumer electronic equipment. The shape may be in oval/dumbbell shape to aid in separation of conductors.

This specification covers a black communication cable of 1.02mm diameter z-core parallel construction as per KS 04-1230-1.

2 Normative references

The following referenced documents are indispensable for the application of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60189-1: Low frequency cables and wires with PVC insulation and PVC sheath - Part 1 : General test and measuring methods

IEC 60815 Selection and dimensioning of high-voltage insulators intended for use in polluted conditions

KS EAS 114:1999 PVC-Insulated cables (non-armoured) for electrical power and lighting - Specification.

KS EAS 116:1999 Copper conductors in insulated cables - Specification.

KS IEC 60502-1:2004 Power cables with extruded insulation and their accessories for rated voltages from 1kV (um = 1,2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1kV (Um = 1,2 kV) and 3 kV (Um = 3,6kV).

IEC 60332: Tests on electric cables under fire conditions - Part 1: Tests on a single vertical insulated wire or cable - Part 3: Tests on bunched wires and cables

IEC 60028: International Standard of resistance for copper

IEC 60304: Standard colours for insulation for low-frequency for cables wires

ISO 105: Textiles - Tests for colour fastness - Part A01: General principles of testing

KS 04-1230-1,3: Low frequency cables and wires with PVC insulation and PVC sheath - Part 1: General requirements and measuring: Part 3: Equipment wires.

KS 765:1986 Standard resistance for copper.

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3 Definitions

For the purpose of this specification, the definitions given in the reference standards shall apply.

4. REQUIREMENTS

4.1 Service Conditions

4.1.1 The equipment wires shall be suitable for continuous use outdoors in tropical areas at:

a) Altitudes of up to 2,200m above sea level,
b) Humidity of up to 95%,
c) Average ambient temperature of +30°C with a minimum of-1°C and a maximum of +40°C

d) Heavy saline conditions along the coast.

e} Pollution: Design pollution level to be taken as "Heavy" (Pollution level III) for inland and "Very Heavy" (Pollution level IV) for coastal applications in accordance with IEC 60815.

f) Isokeraunic level: 180 thunderstorm days per year

4.1.2 The cable should be suitable for laying in cable ducts and in air.

4.2. Material and Construction

4.2.1. Conductor

4.2.1.1. Conductor material - The conductor shall be made of plain annealed high conductivity copper with the following properties measured at 20°c in accordance with KS 765 and/or IEC 60028 :

a) Volume resistivity- 0.0172410mm^2/m,
b) Density- 8.89g/cm^3,
c) Linear expansion - 0.000017f'C
d) Coefficient of variation of resistance - 0.00393f'C,
e) Mass resistivity- 0.153280g/m^2

4.2.1.2. Type of conductor - The conductor shall consist of a single strand, circular in section.

4.2.1.3. Conductor finish - The conductor shall be plain.

4.2.1.4. Conductor dimensions - The conductor designation shall be by its nominal cross sectional area and nominal conductor diameter as per Table 1.

4.2.1.5. Conductor continuity - The conductor shall be drawn in one piece.

4.2.2. Insulation

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4.2.2.1. Composition - The insulating material shall be PVC or its copolymers or both suitably compounded to meet the requirements of general-purpose insulation for 70°C operation in accordance with KS 1230-1.

4.2.2.2. Thickness - The insulation shall be perfectly continuous having a thickness as uniform as possible and not less the values specified in Table 1.

The minimum thickness of the insulation shall be measured in accordance with the method specified in clause 4.4.1.2 of KS 1230-1 or in accordance with the method specified in clause 5.2.1 of IEC 60189-1.

4.2.2.3. Application - The insulation shall be applied to fit closely to the conductor without adhering to it.

The stripping properties of the insulation shall be checked in accordance with the method specified in clause 4.4.3.1 of KS 1230-1 or in accordance with the method specified in 3.4.1 of IEC 60189-1.

It shall be possible to strip the insulation from the conductor easily without damage to the conductor.

4.2.2.4. Colour - The insulated conductors shall be coloured by one colour. Colours shall correspond reasonably with the standard shown in IEC 60304.

Colour fastness to daylight, checked according to ISO Standard 105, shall be rated at not less than standard 4, prolonging the exposure until the contrast is equivalent to grade 4 on the grey scale.

The choice of colours or combination of colours shall be made black.

4.2.3. The construction of the conductors shall be a pair of two insulated conductors as per Fig. 1.

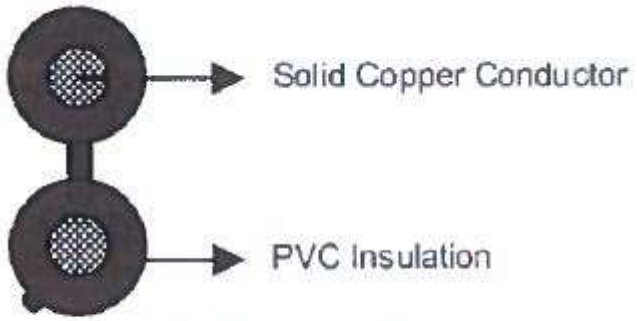

Fig. 1: Pair of insulated conductors

PREVIEW DRAFT

Fig. 1: Pair of insulated conductors

4.2.4. Identification of insulated conductors - Identification of insulated conductors shall be in accordance with 4.2.2.4 above.

4.3. Mechanical Properties of Equipment Wire

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4.3.1. Conductor

Elongation at break of the bare conductor shall be not less than 15.0% as per KS 04-1230-3. Compliance shall be checked by measuring the elongation at break in accordance with the method specified in 3.3 of IEC 60189-1

4.3.2. Insulation

4.3.2.1. The insulation shall have adequate mechanical strength elasticity. These properties shall remain sufficiently constant during normal use. Compliance shall be checked before and after accelerated ageing by measuring the tensile strength and the elongation at break on samples of the insulation in accordance with the method specified in 6.2 of IEC 60189-1.

4.3.2.2. The accelerated ageing conditioning is specified in 4.1 of IEC 60189-1.

4.3.2.3. The median of the measured values of tensile strength shall be not less than 12.5 N/mm^2 (12.5 MPa). (See Notes 1 and 2 hereafter).The median of the measured values of elongation at break shall be not less than 125 % for single-colour insulation, whose minimum thickness is 0.3 mm or less.

4.3.2.4. Moreover, the difference between the median values for tensile strength and elongation obtained before and after accelerated ageing shall not exceed 20 % of the median values before ageing.

NOTES:
1. The values specified for tensile strength and for elongation at break are independent and non concomitant minima. An insulation with one characteristic of near-minimum value should present a value well above the minimum for the other characteristic.

2. The median value is the middle value if an odd number of values is obtained or the average of the two middle values if an even number of values is obtained. The test results should have been arranged in sequence of increasing values.

4.4. Thermal stability and climatic requirements for drop wire

4.4.1. Measurement of insulation shrinkage after over-heating of conductor

The insulation shall not shrink unduly when soldering the conductor. Compliance shall be checked in accordance with the method specified in 4.6 of IEC 60189-1. The measured shrinkage shall be not more than 4 %.

4.4.2. Resistance to flame propagation

Resistance to flame propagation shall be checked in accordance with the method specified in 4.3.1 of IEC 60189-1.

4.4.3. Heat shock test

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The insulation shall withstand variations in temperature without suffering damage. Compliance shall be checked in accordance with the method specified in 4.5.1 of IEC 60189-1. The insulation shall show no cracks.

4.4.4. UV resistance

The PVC compound shall be treated with anti-UV chemicals to prevent UV attack by sunlight. When exposed to a light of wavelength of 300nm to 400nm with an irradiance of
60±2 W/m^2 at a black standard temperature of 65±3°C and a humidity of 50% for a period of
102 min day, the insulation shall not fail. UV stability shall be tested in accordance to ISO
4892-2 method A.

4.4.5. Permissible continuous loading operating temperature shall be 70° C and short circuit temperature of 160°C.

4.5. Electrical requirements for telecommunication drop wire

4.5.1. Electrical resistance of conductor

The electrical resistance of the conductor measured at a temperature of 20 °C, shall not exceed the value specified in Table 1. The method for measuring the resistance and also for correcting the measured values for length and temperature are specified in 8.1 of IEC
60189-1.

4.5.2. Dielectric strength

The insulation shall withstand the application for one minute without breakdown of the voltage specified in Table 1. The method for checking the dielectric strength is specified in
5.2 of IEC 60189-1.

4.5.3. Insulation resistance

Insulation resistance measured at a temperature of 20 °C shall be not less than the value specified in Table 1. The method for measuring the insulation resistance is specified in 5.3 of IEC 60189-1.

4.5.4. Capacitance

4.5.4.1. Mutual capacitance

The mutual capacitance of any pair of conductors shall not exceed 131 nF/km. The method for measurement of mutual capacitance is specified in 5.4 of IEC 60189-1.

4.5.4.2. Capacitance unbalance

The capacitance unbalance between any two pairs of different cabling elements shall not exceed 400 pF per 500 m length of cable. The method for measurement of capacitance unbalance is specified in 5.5 of IEC 60189-1.

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Table 1: Physical and electrical properties of the cable

Sr no	Property		Requirement
1.	Conductor	Nominal diameter, mm	1.02 (+0.03 or -0.06)
		Nominal cross sectional area,mm^2	0.827
		Maximum resistance at 20^0C,Ω/km	21.73
		Elongation at break, min,%	18%
3.	Insulation	Minimum thickness, mm	1.02
		Nominal insulated conductor diameter, mm	3.06
		Tensile strength, MPa	12.5
		Elongation at break, min %	125
		Insulation shrinkage, min%	4
		Elongation and tensile strength after accelerated ageing, %	< 20
4.	Test Requirements	Dielectric strength test voltage, V	2500ac
		Minimum insulation resistance at 20^0C,MΩ .KM	30
5.	Approximate weight, kg/km		36

6. PACKING, MARKING AND LABELLING

6.1 CABLE MARKING

The cable shall be be legibly and durably marked (by indenting, embossing or by printing), the following items;

Name and/or trade mark of Manufacturer

Standard of Manufacture

Size of Cable

6.2 PACKAGING

The wires or cable shall be either wound on reels or coiled, packaged and labeled.

6.3 LABELLING

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The label which shall be securely attached on the reel or coil and shall contain the following information;

a) Name and/or trade mark of manufacturer
b) Nominal dimensions of the conductor of wire or cable.
c) Type of wire or cable
d) Length of cable contained in the reel or coil
e) Country of manufacture.
f) Standard of manufacture.

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