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600 V Polyethylene insulated cables

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Foreword

This Japanese Industrial Standard has been revised by the Minister of Economy, Trade and Industry based on the provision of Article 14, paragraph (1) of the Industrial Standardization Act applied mutatis mutandis pursuant to the provision of Article 16 of the said Act in response to a proposal for revision of Japanese Industrial Standard with a draft being attached, submitted by Japanese Standards Association (JSA), an accredited standards development organization. This edition replaces the previous edition (**JIS C 3605** : 2002), which has been technically revised.

However, **JIS C 3605** : 2002 may be applied in the **JIS** mark certification based on the relevant provisions of Article 30, paragraph (1), etc. of the Industrial Standardization Act until 19 May 2023.

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600 V Polyethylene insulated cables

1 Scope

This Japanese Industrial Standard specifies requirements for polyethylene insulated cables (hereafter referred to as cables), to be used in circuits of a nominal voltage of 600 V or under, which are insulated with polyethylene or cross-linked polyethylene, and are sheathed with a compound mainly composed of polyvinyl chloride resins (hereafter referred to as vinyl), polyethylene, or a flame retardant compound mainly composed of polyethylene resins (hereafter referred to as flame retardant polyethylene).

2 Normative references

Part or all of the provisions of the following standards, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated below shall be applied.

JIS C 3005 *Test methods for rubber or plastic insulated wires and cables*

JIS C 3102 *Annealed copper wires for electrical purposes*

JIS C 3612 *600V Flame retardant polyethylene insulated wires*

JIS C 3666-2 *Test on gases evolved during combustion of materials from cables — Part 2 : Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity*

3 Terms and definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1

duplex type

structure in which two single-core cables are twisted together

3.2

triplex type

structure in which three single-core cables are twisted together

3.3

quadruplex type

structure in which four single-core cables are twisted together

3.4

concentric lay

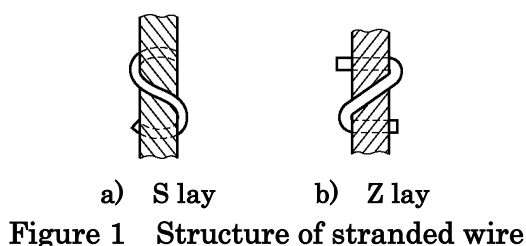
cable laid concentrically with one or more layers of stranded wires

3.5

S lay

cable with component wires or cores of stranded wire, of which the direction of lay is S-shaped [Figure 1 a)]

Note 1 to entry Cables with component wires or cores of stranded wire, of which the direction of lay is Z-shaped are called Z-lay cables [Figure 1 b)].



3.6

SZ lay

cable with component wires or cores of stranded wire, of which the direction of lay is reversed every pitch from S lay to Z lay and from Z lay to S lay

3.7

pitch circle diameter

diameter of a circle that passes through the centre of all cores in the layer of stranded wires and cores that are twisted together

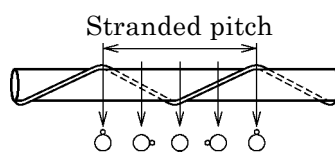
Note 1 to entry See Note ¹⁾ to 4.3.2 e) of JIS C 3005.

3.8

stranded pitch

length along the axial direction that a component wire or core travels in one revolution

Note 1 to entry For stranded pitch, see Figure 2.



4 Classification, symbols and type

Classification, symbols and type shall be as given in Table 1.

Table 1 Classification, symbols and type

Classification	Symbol	Type
600 V polyethylene insulated vinyl sheathed cable	600 V EV	Single-core and multi-core round type
600 V polyethylene insulated polyethylene sheathed cable	600 V EE	
600 V cross-linked polyethylene insulated vinyl sheathed cable	600 V CV	
600 V cross-linked polyethylene insulated polyethylene sheathed cable	600 V CE	
600 V polyethylene insulated flame retardant polyethylene sheathed cable	600 V EE/F ^{a)}	
600 V cross-linked polyethylene insulated flame retardant polyethylene sheathed cable	600 V CE/F ^{b)}	
600 V polyethylene insulated flame retardant polyethylene sheathed cable, flat type	600 V EEFF/F ^{c)}	Multi-core flat type
600 V cross-linked polyethylene insulated flame retardant polyethylene sheathed cable, flat type	600 V CEF/F ^{d)}	
600 V duplex type cross-linked polyethylene insulated vinyl sheathed cable	600 V CVD	Single-core stranded type
600 V duplex type cross-linked polyethylene insulated polyethylene sheathed cable	600 V CED	
600 V duplex type cross-linked polyethylene insulated flame retardant polyethylene sheathed cable	600 V CED/F ^{e)}	
600 V triplex type cross-linked polyethylene insulated vinyl sheathed cable	600 V CVT	
600 V triplex type cross-linked polyethylene insulated polyethylene sheathed cable	600 V CET	
600 V triplex type cross-linked polyethylene insulated flame retardant polyethylene sheathed cable	600 V CET/F ^{f)}	
600 V quadruplex type cross-linked polyethylene insulated vinyl sheathed cable	600 V CVQ	
600 V quadruplex type cross-linked polyethylene insulated polyethylene sheathed cable	600 V CEQ	
600 V quadruplex type cross-linked polyethylene insulated flame retardant polyethylene sheathed cable	600 V CEQ/F ^{g)}	
Key E : polyethylene C : cross-linked polyethylene V : vinyl F : flat type /F : flame retardant (limited to those not containing halogen elements and of low smoke-evolution) D : duplex type T : triplex type Q : quadruplex type Note ^{a)} Commonly known as EM-EE. Note ^{b)} Commonly known as EM-CE. Note ^{c)} Commonly known as EM-EEF. Note ^{d)} Commonly known as EM-CEF. Note ^{e)} Commonly known as EM-CED. Note ^{f)} Commonly known as EM-CET. Note ^{g)} Commonly known as EM-CEQ.		

5 Characteristics

The characteristics shall be as given in Table 2, when tested in accordance with Clause 7.

Table 2 Characteristics

Item				Characteristics	Applicable sub-clause for test method
Conductor resistance				Not more than the value in Tables 8 to 16	7.3
Dielectric withstand voltage		In water		Withstand the test voltage in Tables 8 to 16 for 1 min	7.4
		In air		Withstand twice the test voltage in Tables 9 to 16 for 1 min	
		Spark		Withstand 5 times the test voltage in Table 8	
Insulation resistance				Not less than the value in Tables 8 to 16	7.5
Tensile properties of insulation and sheath	Insulation	Polyethylene	Tensile strength	Not less than 10 MPa	7.6
			Elongation	Not less than 350 %	
		Cross-linked polyethylene	Tensile strength	Not less than 10 MPa	
			Elongation	Not less than 200 %	
	Sheath	Vinyl	Tensile strength	Not less than 10 MPa	
			Elongation	Not less than 120 %	
		Polyethylene and flame retardant polyethylene	Tensile strength	Not less than 10 MPa	
			Elongation	Not less than 350 %	
Thermal ageing	Insulation	Polyethylene	Tensile strength	Not less than 80 % of the value before ageing	7.7
			Elongation	Not less than 65 % of the value before ageing	
		Cross-linked polyethylene	Tensile strength	Not less than 80 % of the value before ageing	
			Elongation		
	Sheath	Vinyl	Tensile strength	Not less than 85 % of the value before ageing	
			Elongation	Not less than 80 % of the value before ageing	
		Polyethylene and flame retardant polyethylene	Tensile strength	Not less than 65 % of the value before ageing	
			Elongation		
Oil resistance	Vinyl sheath		Tensile strength	Not less than 80 % of the value before immersion	7.8
			Elongation	Not less than 60 % of the value before immersion	
Heat shock	Vinyl sheath			Free from crack or flaw on surface	7.9
Low-temperature impact	Polyethylene sheath and flame retardant polyethylene sheath Vinyl sheath			No fracture of test piece	7.10
Heat deformation	Insulation	Polyethylene		Not more than 10 % of thickness reduction	7.11
		Cross-linked polyethylene		Not more than 40 % of thickness reduction	
	Sheath	Vinyl		Not more than 50 % of thickness reduction	
		Polyethylene and flame retardant polyethylene		Not more than 10 % of thickness reduction	