

Report No.: TN21-1691E

Sample No.: CN21-1316

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Contract No.: ISTCW21-0523

## Test Report

Consigner Hennan Huadong Cable Co., Ltd.  
North side of the west section of Yunxiang Road, Industrial cluster area, Jiaozuo City, Henan Province

Sample Name 18/30kV Copper conductor XLPE insulation steel wire armour PVC outer sheath flame retardant power cable

Type and Size ZC-YJV32 18/30kV 3×300

Kind of test Type Test

Sample Received Date March 25, 2021

Test Duration March 27, 2021 - April 26, 2021

Test Conclusion  
1. The sample has been carried out to the series of tests in accordance with IEC 60502-2:2014. The results indicate that the sample complies with the requirements of IEC 60502-2:2014.  
2. The flame spread test on bunched cables (Category C) items complies with the requirements of IEC 60332-3-24:2018.

Authorized by  
Shanghai Intelligent Service and Technology Co., Ltd.

李骥 Li Ji



Issue date

2021-04-27

Testing Engineer: 袁常俊 Yuan Changjun

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## 1 Sample Description

Manufacturer	Hennan Huadong Cable Co., Ltd. North side of the west section of Yunxiang Road, Industrial cluster area, Jiaozuo City, Henan Province
Type and Size	ZC-YJV32 18/30kV 3×300
Quantity	35m
Marking	Hennan Huadong Cable Co., Ltd. 18/30kV 3×300mm <sup>2</sup> CU/XLPE/CTS/PVC/ SWA/FR-PVC Flame retardant Power Cable meters
Color	Black
Source	Sent by the consigner
Status	Normal appearance

## 2 Testing and Verdict Standards

### 2.1 Testing Standards

IEC 60502-2:2014 Power cables with extruded insulation and their accessories for rated voltages from 1 kV ( $U_m = 1,2$  kV) up to 30 kV ( $U_m = 36$  kV) – Part 2: Cables for rated voltages from 6 kV ( $U_m = 7,2$  kV) up to 30 kV ( $U_m = 36$  kV)

IEC 60332-3-24:2018 Tests on electric and optical fibre cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

### 2.2 Verdict Standards

Same to Testing Standards

## 3 Other Information

### 3.1 Description of the testing party

- The sample's name, type and size, manufacturer information are provided by the consigner;
- The additional tests item (7) of conductor resistance and cable construction requested by the consigner;
- This report is the English version of test report of TN21-1691, If there is any inconsistency or conflict between the English and Chinese versions, the Chinese version shall prevail for all purposes.

### 3.2 Test location

- The following test items were conducted at No.458 Haixiang Road, Fengxian District, Shanghai:
- electric type test of 4.1 to 4.5 including bending test, followed by a partial discharge test,  $\tan \delta$  measurement, heating cycle test, followed by a partial discharge test, impulse test, followed by a voltage test and voltage test for 4h;
  - flame spread test on bunched cables (Category C).

### 3.3 Symbol Definition

P = complying with requirement / Pass, F = not complying with requirement / Fail, N = not required

## 4 Electrical type tests

### 4.1 Bending test, followed by a partial discharge test

#### 4.1.1 Bending test

The bending test on the cable was carried out in accordance with 18.2.2 a) of IEC 60502-2:2014. The test method was 18.2.4 of IEC 60502-2:2014.

Test parameters

Ambient temperature	18 °C
Sample length	13 m

Diameter of the conductor d (mm)	External diameter of the cable D (mm)	Required bending diameter $D_r \leq 15(d+D)+5\%$ (mm)	Actual bending diameter D <sub>a</sub> (mm)	Observations
108.5	21.0	≤1943+97	1900*	3 cycles

Note: "\*" The consigner requires smaller bending diameter.

Procedure	The sample shall be bent around a test cylinder at ambient temperature for at least one complete turn. It shall then be unwound and the process repeated, except that the bending of the sample shall be in the reverse direction without axial rotation. This cycle of operation shall be carried out three times.
Observation	The test was carried out successfully.

#### 4.1.2 Partial discharge test

After the bending test, the partial discharge test was carried out in accordance with 18.2.2 a) of IEC 60502-2:2014.

The test method was 18.2.5 of IEC 60502-2:2014 and IEC 60885-3:2015.

Test parameters

Ambient temperature	18 °C
Temperature of test object	18 °C
Test circuit	direct
Power frequency	50 Hz
Calibration	5 pC
Noise	0.5/0.6/0.6 pC



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Core	Voltage applied, 50Hz		Duration (s)	PD level (pC)
	...×U <sub>0</sub>	(kV)		
Red	2	36	10	<1.0
	1.73	31	-	<0.8
Yellow	2	36	10	<1.0
	1.73	31	-	<0.9
Green	2	36	10	<0.9
	1.73	31	-	<0.9

Item	Requirement	Test Result	Verdict
Partial discharge test	There shall be no detectable discharge exceeding the declared sensitivity from the test object at 1.73 U <sub>0</sub>	There no detectable discharge exceeding the declared sensitivity (0.9pC) from the test object at 1.73 U <sub>0</sub>	P

#### 4.2 Tan δ measurement

The tan δ measurement was carried out in accordance with 18.2.2 b) of IEC 60502-2:2014.  
The test method was 18.2.6 of IEC 60502-2:2014.

Test parameters

Ambient temperature	20	°C
Temperature of test object	98	°C
Standard capacitor	49,65	pF

Voltage applied to 2.5kV, 50Hz

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
C*	μF/km	/	0.27	0.27	0.27	N
Tan δ		≤40×10 <sup>-4</sup>	3.0×10 <sup>-4</sup>	2.9×10 <sup>-4</sup>	2.8×10 <sup>-4</sup>	P

Note: "\*" for reference only.

#### 4.3 Heating cycle test followed by a partial discharge test

##### 4.3.1 Heating cycle test

The heating cycle test was carried out in accordance with 18.2.2 c) of IEC 60502-2:2014.  
The test method was 18.2.7 of IEC 60502-2:2014.

Test parameters

Ambient temperature	15-21	°C
Temperature of test object	Ambient-99	°C

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No. of heating cycles	Required stable conductor temperature (°C)	Heating current (A)	Heating per cycle		Natural cooling per cycle
			Total duration (h)	Duration of conductor at stable temperature (h)	Total duration (h)
20	95-100	721-737	5	2	3

Result	The test was carried out successfully.
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#### 4.3.2 Partial discharge test

After the heating cycle test, the partial discharge test was carried out in accordance with 18.2.2 c) of IEC 60502-2:2014.

The test method was 18.2.5 of IEC 60502-2:2014 and IEC 60885-3:2015.

Test parameters

Ambient temperature	18 °C
Temperature of test object	18 °C
Test circuit	direct
Power frequency	50 Hz
Calibration	5 pC
Noise	0.5/0.6/0.5 pC

Core	Voltage applied, 50Hz		Duration (s)	PD level (pC)
	...×U <sub>0</sub>	(kV)		
Red	2	36	10	<0.8
	1.73	31	-	<0.8
Yellow	2	36	10	<0.8
	1.73	31	-	<0.8
Green	2	36	10	<0.9
	1.73	31	-	<0.7

Item	Requirement	Test Result	Verdict
Partial discharge test at ambient temperature	There shall be no detectable discharge exceeding the declared sensitivity from the test object at 1.73 U <sub>0</sub>	There no detectable discharge exceeding the declared sensitivity (0.8pC) from the test object at 1.73 U <sub>0</sub>	P

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#### 4.4 Impulse test followed by a voltage test

##### 4.4.1 Impulse test

The impulse test was carried out in accordance with 18.2.2 d) of IEC 60502-2:2014.

The test method was 18.2.8 of IEC 60502-2:2014 and IEC 60230:2018.

Heating by conductor current, until the cable conductor reached steady temperature of 95°C-100°C, the voltage impulse was performed.

Test parameters

Ambient temperature 18 °C

Temperature of test object 98 °C

Specified test voltage: 170(kV)		Polarity	Voltage applied (% of test voltage)	No. of impulse
Voltage applied to	Earth connected to			
Conductor	Metal screens	Positive	50	1
			65	1
			80	1
			100	10
Conductor	Metal screens	Negative	50	1
			65	1
			80	1
			100	10

Polarity	Actual withstand voltage (kV), allow ±3% tolerances									
Positive	84.9	110.1	136.5	-	-	-	-	-	-	-
	170.7	170.6	171.2	171.2	171.1	171.0	171.6	168.6	168.7	173.1
Negative	85.3	109.8	136.1	-	-	-	-	-	-	-
	170.7	170.4	169.9	170.0	170.2	170.2	165.0	165.2	165.4	166.6

Item	Requirement	Test Result	Verdict
Impulse test	The cable shall withstand without failure or flashover 10 positive and 10 negative voltage impulses of 170kV.	The three cores of cable were withstood without failure or flashover 10 positive and 10 negative voltage impulses of 170kV.	P



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#### 4.4.2 Voltage test

The voltage test was carried out in accordance with 18.2.2 d) of IEC 60502-2:2014.

The test method was 18.2.8 of IEC 60502-2:2014.

After the impulse test, the cable was subjected to a power frequency voltage test at ambient temperature.

Test parameters

Ambient temperature 18 °C

Test connection		Voltage applied, 50Hz		Duration (min)		
Voltage applied to	Earth connected to	...×U <sub>0</sub>	(kV)	Red	Yellow	Green
Conductor	Metal screens	3.5	63	15	15	15

Test Item	Requirement	Test Result	Verdict
Voltage test	No breakdown of the insulation shall occur	No breakdown of the insulation	P

#### 4.5 Voltage test for 4h

The voltage test for 4h was carried out in accordance with 18.2.2 e) of IEC 60502-2:2014.

The test method was 18.2.9 of IEC 60502-2:2014.

Test parameters

Ambient temperature 17 °C

Test connection		Voltage applied, 50Hz		Duration (h)		
Voltage applied to	Earth connected to	...×U <sub>0</sub>	(kV)	Red	Yellow	Green
Conductor	Metal screens	4	72	4	4	4

Test Item	Requirement	Test Result	Verdict
Voltage test for 4h	No breakdown of the insulation shall occur	No breakdown of the insulation	P

#### 4.6 Resistivity of semi-conducting screens

The resistivity of semi-conducting screens test was carried out in accordance with 18.2.10 of IEC 60502-2:2014.

The test method was Annex D of IEC 60502-2:2014.

Test parameters:

Measurement of temperature	90	°C
Ageing temperature	100	°C
Duration	168	h

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>Conductor screen</b>						
- without ageing	$\Omega \cdot m$	$\leq 1000$	94.05	138.7	117.5	P
- after ageing on pieces of completed cable	$\Omega \cdot m$	$\leq 1000$	233.5	213.7	270.1	P
<b>Insulation screen</b>						
- without ageing	$\Omega \cdot m$	$\leq 500$	2.34	1.99	2.18	P
- after ageing on pieces of completed cable	$\Omega \cdot m$	$\leq 500$	6.60	7.44	6.06	P

### 5 Non-electrical type tests

#### 5.1 Measurement of thickness of insulation

The measurement of thickness of insulation was carried out in accordance with 19.2 of IEC 60502-2:2014.

The test method was IEC 60811-201:2012+A1:2017.

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>Nominal thickness: 8.0</b>						
- average thickness	mm	/	7.8	7.6	7.8	N
- minimum thickness ( $t_{min}$ )	mm	$\geq 7.10$	7.52	7.54	7.50	P
- maximum thickness ( $t_{max}$ )	mm	/	8.08	7.98	7.97	N
- $(t_{max} - t_{min}) / t_{max}$		$\leq 0.15$	0.07	0.06	0.06	P



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## 5.2 Measurement of thickness of non-metal sheaths

The measurement of thickness of non-metal sheaths was carried out in accordance with 19.3 of IEC 60502-2:2014.

The test method was IEC 60811-202:2012+A1:2017.

### PVC separation sheath (ST<sub>2</sub>)

Item	Unit	Requirement	Test Result	Verdict
<b>Nominal thickness: 2.3</b>	mm			
- average thickness	mm	/	2.7	N
- minimum thickness	mm	≥1.64	2.05	P

### PVC oversheath (ST<sub>2</sub>)

Item	Unit	Requirement	Test Result	Verdict
<b>Nominal thickness: 4.3</b>	mm			
- average thickness	mm	/	4.5	N
- minimum thickness	mm	≥3.24	3.65	P

## 5.3 Tests for determining the mechanical properties of insulation before and after ageing

The tests for determining the mechanical properties of insulation before and after ageing were carried out in accordance with 19.5 of IEC 60502-2:2014.

The test method was IEC 60811-501:2012+A1:2018.

The ageing treatments was carried out in accordance with IEC 60811-401:2012+A1:2017.

Test parameters

Ageing temperature	135 °C
Duration	168 h
Test temperature	23 °C
Separation rate	250 mm/min

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>Without ageing</b>						
- tensile strength	N/mm <sup>2</sup>	≥12.5	21.5	21.9	21.1	P
- elongation-at-break	%	≥200	550	550	540	P
<b>After ageing without conductor</b>						
- tensile strength	N/mm <sup>2</sup>	/	23.9	24.2	24.7	N
- variation with samples without ageing	%	≤±25	+11	+11	+17	P
- elongation-at-break	%	/	590	600	600	N
- variation with samples without ageing	%	≤±25	+7	+9	+11	P

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#### 5.4 Tests for determining the mechanical properties of non-metal sheaths before and after ageing

The tests for determining the mechanical properties of non-metal sheaths before and after ageing were carried out in accordance with 19.6 of IEC 60502-2:2014.

The test method was IEC 60811-501:2012+A1:2018.

The ageing treatments was carried out in accordance with IEC 60811-401:2012+A1:2017.

Test parameters:

Ageing temperature	100 °C
Duration	168 h
Test temperature	23 °C
Separation rate	250 mm/min

#### PVC separation sheath (ST<sub>2</sub>)

Item	Unit	Requirement	Test Result	Verdict
<b>Without ageing</b>				
- tensile strength	N/mm <sup>2</sup>	≥12,5	18.5	P
- elongation-at-break	%	≥150	300	P
<b>After ageing</b>				
- tensile strength	N/mm <sup>2</sup>	≥12,5	19.4	P
- variation with samples without ageing	%	≤±25	+5	P
- elongation-at-break	%	≥150	320	P
- variation with samples without ageing	%	≤±25	+7	P

#### PVC oversheath (ST<sub>2</sub>)

Item	Unit	Requirement	Test Result	Verdict
<b>Without ageing</b>				
- tensile strength	N/mm <sup>2</sup>	≥12,5	18.8	P
- elongation-at-break	%	≥150	310	P
<b>After ageing</b>				
- tensile strength	N/mm <sup>2</sup>	≥12.5	19.4	P
- variation with samples without ageing	%	≤±25	+3	P
- elongation-at-break	%	≥150	330	P
- variation with samples without ageing	%	≤±25	+6	P

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### 5.5 Additional ageing test on pieces of completed cables

The additional ageing test on pieces of completed cables was carried out in accordance with 19.7 of IEC 60502-2:2014.

The test method was IEC 60811-501:2012+A1:2018.

The ageing treatments was carried out in accordance with IEC 60811-401:2012+A1:2017.

Test parameters

Ageing temperature	100	°C
Duration	168	h
Test temperature	23	°C
Separation rate	250	mm/min

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>Insulation</b>						
- tensile strength	N/mm <sup>2</sup>	/	22.1	22.7	22.2	N
- variation with samples without ageing	%	≤±25	+3	+4	+5	P
- elongation-at-break	%	/	550	560	560	N
- variation with samples without ageing	%	≤±25	0	+2	+4	P
<b>Separation sheath (ST<sub>2</sub>)</b>						
- tensile strength	N/mm <sup>2</sup>	/		19.1		N
- variation with samples without ageing	%	≤±25		+3		P
- elongation-at-break	%	/		310		N
- variation with samples without ageing	%	≤±25		+3		P
<b>Oversheath (ST<sub>2</sub>)</b>						
- tensile strength	N/mm <sup>2</sup>	/		19.1		N
- variation with samples without ageing	%	≤±25		+2		P
- elongation-at-break	%	/		320		N
- variation with samples without ageing	%	≤±25		+3		P

### 5.6 Loss of mass test on PVC sheaths of type ST<sub>2</sub>

The Loss of mass test on PVC sheaths of type ST<sub>2</sub> were carried out in accordance with 19.8 of IEC 60502-2:2014.

The test method was IEC 60811-409:2012.

Test parameters

Ageing temperature	100	°C
Duration	168	h

#### PVC separation sheath (ST<sub>2</sub>)

Item	Unit	Requirement	Test Result	Verdict
Loss of mass	mg/cm <sup>2</sup>	≤1.5	0.8	P



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**PVC overshooth (ST<sub>2</sub>)**

Item	Unit	Requirement	Test Result	Verdict
Loss of mass	mg/cm <sup>2</sup>	≤1.5	0.8	P

**5.7 Pressure test at high temperature on non-metal sheaths**

The pressure test at high temperature on non-metal sheaths was carried out in accordance with 19.9 of IEC 60502-2:2014.

The test method was IEC 60811-508:2012+A1:2017.

Test parameters

Temperature	90	°C
Duration	6	h
Force(Separation sheath)	15.6	N
Force(Oversheath)	21.6	N

**PVC separation sheath (ST<sub>2</sub>)**

Item	Unit	Requirement	Test Result	Verdict
Depth of indentation	%	≤50	19	P

**PVC overshooth (ST<sub>2</sub>)**

Item	Unit	Requirement	Test Result	Verdict
Depth of indentation	%	≤50	21	P

**5.8 Test on PVC sheaths at low temperatures**

The test on PVC sheaths at low temperatures was carried out in accordance with 19.10 of IEC 60502-2:2014.

The test method was IEC 60811-505:2012 and IEC 60811-506:2012.

**5.8.1 Cold elongation test**

Test parameters

Temperature	-15	°C
Duration	4	h

**PVC separation sheath (ST<sub>2</sub>)**

Item	Unit	Requirement	Test Result	Verdict
Elongation	%	≥20	80	P

**PVC overshooth (ST<sub>2</sub>)**

Item	Unit	Requirement	Test Result	Verdict
Elongation	%	≥20	83	P

### 5.8.2 Cold impact test

Test parameters

Temperature	-15	°C
Duration of treatment	16	h
Weight	1500	g

#### PVC oversheath (ST<sub>2</sub>)

Test Item	Requirement	Test Result	Verdict
Check on inner and outer surfaces	No cracks	No cracks	P

### 5.9 Test for resistance of PVC sheaths to cracking (heat shock test)

The test for resistance of PVC sheaths to cracking (heat shock test) was carried out in according to 19.11 of IEC 60502-2:2014.

Test method was IEC 60811-509:2012+A1:2017.

Test parameters

Temperature	150	°C
Duration of treatment	1	h

#### PVC separation sheath (ST<sub>2</sub>)

Test Item	Requirement	Test Result	Verdict
Check on surfaces	No cracks	No cracks	P

#### PVC oversheath (ST<sub>2</sub>)

Test Item	Requirement	Test Result	Verdict
Check on surfaces	No cracks	No cracks	P

### 5.10 Hot set test for XLPE insulations

The hot set test for XLPE insulations was carried out in accordance with 19.13 of IEC 60502-2:2014. The test method was IEC 60811-507:2012.

Test parameters

Temperature	200	°C
Time under load	15	min
Mechanical stress	20	N/cm <sup>2</sup>

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
Elongation under load	%	≤175	53	58	55	P
Permanent elongation after cooling	%	≤15	0	0	0	P

### 5.11 Water absorption test on insulation

The water absorption test on insulation was carried out in accordance with 19.15 of IEC 60502-2:2014.

The test method was IEC 60811-402:2012.

Test parameters

Temperature 85 °C

Duration 336 h

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
Increase of mass	mg/cm <sup>2</sup>	≤1	0.07	0.07	0.07	P

### 5.12 Flame spread test on single cables

The flame spread test on single cables was carried out in according to 19.16 of IEC 60502-2:2014.

The test method was IEC 60332-1-2:2015.

Test parameters:

Pretreatment temperature 23 °C

Pretreatment relative humidity 50 %

Pretreatment time 24 h

Flame application time 480 s

Test Item	Unit	Requirement	Test Result	Verdict
The distance between the lower edge of the top support and the onset of charring	mm	>50	376	P
The distance from the lower edge of the top support to the lower onset of charring	mm	≤540	525	P

### 5.13 Shrinkage test for XLPE insulation

The shrinkage test for XLPE insulation was carried out in accordance with 19.18 of IEC 60502-2:2014.

The test method was IEC 60811-502:2012.

Test parameters:

Distance between marks 200 mm

Temperature 130 °C

Duration 1 h



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Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
Shrinkage	%	≤4	2	2	1	P

#### 5.14 Strippability test for insulation screen

The strippability test for insulation screen was carried out in accordance with 19.23 of IEC 60502-2:2014.

The test method was 19.23 of IEC 60502-2:2014.

Test parameters

Ageing temperature	100	°C
Duration	168	h
Test temperature	23	°C
Separation rate	250	mm/min

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>Without ageing</b>						
- force	N	4-45	27-30	28-29	28-31	P
- check on insulation surfaces		The insulation surface shall not be damaged and no trace of the semiconducting screen shall remain on the insulation.	Passed			P
<b>After ageing</b>						
- force	N	4-45	23-24	24-25	23-26	P
- check on insulation surfaces		The insulation surface shall not be damaged and no trace of the semiconducting screen shall remain on the insulation.	Passed			P

#### 6 Flame spread test on bunched cables (Category C)

The test method was IEC 60332-3-24:2018.

Test parameters

Number of test pieces	2
Total volume of non-metallic	1.5 L/m
Positioning of test pieces	Touched
Number of layers	1
Flame application time	20 min
Number of burners	1

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Item	Unit	Requirement	Test Result	Verdict
Maximum extent of the charred portion above the bottom edge of the burner	m	≤2.5	0.89	P
Time to extinction of all burning or glowing	h	/	0.05	N

## 7 The additional tests

### 7.1 Measurement of the electrical resistance of conductor

The measurement of the electrical resistance of conductor test was carried out in accordance with 16 a) of IEC 60502-2:2014.

The test method was 16.2 of IEC 60502-2:2014.

Test parameters

Environment temperature 20 °C

Duration of time 24 h

Test Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
Conductor resistance at 20°C	Ω/km	≤0.0601	0.0597	0.0595	0.0597	P

### 7.2 Check of cable construction

The check of cable construction was carried out in accordance with 5-7, 9-11, 13-14 and 17.4-17.8 of IEC 60502-2:2014.

The test method was IEC 60228: 2004, IEC 60811-201:2012+A1:2017, IEC 60811-202:2012+A1:2017, IEC 60811-203:2012 and 17.7 of IEC 60502-2:2014.

Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>Conductor</b>						
- class		Class 1 or class 2 in IEC 60228	Class 2 in IEC 60228			P
- material		Copper	Copper	Copper	Copper	P
- type		/	Stranded circular compacted			N
- no. of wires		≥34	61	61	61	P
<b>Conductor screen</b>						
- average thickness	mm	/	1.1	1.1	1.1	N
- minimum thickness	mm	/	0.99	0.92	0.94	N

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Item	Unit	Requirement	Test Result			Verdict
			Red	Yellow	Green	
<b>XLPE Insulation</b>						
Nominal thickness: 8.0	mm					
- average thickness	mm	/	7.8	7.6	7.8	N
- minimum thickness ( $t_{min}$ )	mm	$\geq 7.10$	7.52	7.54	7.50	P
- maximum thickness ( $t_{max}$ )	mm	/	8.08	7.98	7.97	N
- ( $t_{max} - t_{min}$ ) / $t_{max}$		$\leq 0.15$	0.07	0.06	0.06	P
<b>Insulation screen</b>						
- average thickness	mm	/	0.8	0.8	0.8	N
- minimum thickness	mm	/	0.73	0.70	0.73	N
<b>Metal screen</b>						
- type		/	Copper tape			N
- minimum thickness	mm	$\geq 0.09$	0.11	0.11	0.11	P
- width	mm	/	40	40	40	N
- Minimum covering rate	%	$\geq 5$	20	18	20	P
<b>PVC separation sheath</b>						
Nominal thickness: 2.3	mm					
- average thickness	mm	/		2.7		N
- minimum thickness	mm	$\geq 1.64$		2.05		P
<b>Metallic armour</b>						
- type		Round wire	Round wire			P
- material		Steel	Galvanized steel			P
- no. of wires	mm	/	89			N
Nominal diameter: 3.15	mm					
- average diameter	mm	$\geq 2.99$		3.11		P
<b>PVC oversheath</b>						
Nominal thickness: 4.3	mm					
- average thickness	mm	/		4.5		N
- minimum thickness	mm	$\geq 3.24$		3.65		P
<b>The complete cable</b>						
- colour		/	Black			N
- average overall diameter	mm	/	108.5			N

- The End -