





# Test Report

Name of sample PVC SDI

Specifications  $\underline{Cu/V-90/5V-90} \ 0.6/1kV \ 1 \times 630 \ mm^2$  (round)

Inspected unit Nanyang Cable (Tianjin) Co., Ltd.

Test purpose Commission Test



Guangdong Testing Institute Of Product Quality Supervision (GQI)

# **Guangdong Testing Institute of Product Quality Supervision**

#### Test Report

№DX1302928			P.1/13		
Name of sample	PVC SDI	Туре	Cu/V-90/5V-90 0.6/1kV 1×630 mm <sup>2</sup> (round)		
rune er en pr		Trade mark	NAN		
Inspected unit	Nanyang Cable (Tianjin) Co., Ltd.	Test purpose	Commission Test		
Produced by	Nanyang Cable (Tianjin) Co., Ltd.	Class of sample			
Place of sampling		Date of <del>sampling</del> (receiving)	2013.09.06		
Quantity of sampling	30m	Person of sampling (sending)	LI Yuewu		
Basic quantity		No. of sample tested			
of sampling		or produced date			
Based on	AS/NZS 5000.1: 2005+A1:2006 Electric cables-Polymeric insulated Part 1: For working voltages up to and including 0.6/1(1.2)kV	Tested items	See the report		
Remarks Remarks					
Notes	<ul> <li>1.Bill of testing plan: YDD13/003054.</li> <li>2.Specification applied:</li> <li>(1)AS/NZS 5000.1:2005+A1:2006, (2)AS/NZS 3808:2000+A1:2002+A2:2004, (3)AS/NZS 1660.1:1998, (4)AS/NZS 1660.2.1:1998+A1:2001, (5)AS/NZS 1660.2.3:1998+A1:2000, (6) AS/NZS 1660.3:1998+A1:2001, (7)AS/NZS 1660.5.6:2005, (8)AS/NZS 1125:2001+A1:2004 3.This report must be used with the reports of reference No. DX1302670.</li> </ul>				
Approved by: F Checked by: 好了话 Tested by: 司俊林					

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	Coverage
	Cu/V-90/5V-90 0.6/1 $kV$ 1×(25~630) mm <sup>2</sup>
	Cu/V-90/5V-90 0.6/1kV $2 \times (1.5 \sim 50)  \text{mm}^2 + \text{E}$
	Cu/V-90/5V-90 0.6/1kV $3 \times (1.5 \sim 300) \text{ mm}^2 + \text{E}$
Circular cables	Cu/V-90/5V-90 0.6/1kV $4 \times (1.5 \sim 300) \text{ mm}^2 + \text{E}$
	Cu/V-90/SWA/5V-90 0.6/1kV $2 \times (1.5 \sim 50) \text{ mm}^2 + \text{E}$
	Cu/V-90/SWA/5V-90 0.6/1kV $3 \times (1.5 \sim 300) \text{ mm}^2 + \text{E}$
	Cu/V-90/SWA/5V-90 0.6/1kV $4 \times (1.5 \sim 300) \text{ mm}^2 + \text{E}$

#### Detailed description of test samples

Туре	Description	Test report
Cu/V-90/SWA/5V-90 0.6/1kV 4×95 mm <sup>2</sup> +E(round)	V-90 insulated, wire armour, 5V-90 sheathed, circular shape, four 95 mm <sup>2</sup> cores and one 25 mm <sup>2</sup> earth core, 0.6/1 kV	DX1302670
Cu/V-90/5V-90 0.6/1kV 1×630 mm <sup>2</sup> (round)	V-90 insulated, 5V-90 sheathed, circular shape, one $630 \text{ mm}^2$ cores 0.6/1 kV	DX1302928

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#### Test Schedule

Cu/V-90/5V-90 0.6/1kV  $1 \times 630 \text{ mm}^2$  (round) : V-90 insulated, 5V-90 sheathed (black), circular shape, one 630 mm<sup>2</sup> cores (red), 0.6/1 kV

Test listing	Standard
Conductor	
Number of wires in the conductor	AS/NZS 1125
Conductor resistance (20°C)	AS/NZS_1125
Conductor elongation at rupture	AS/NZS 1125
Insulation	
Tensile strength before ageing	AS/NZS 3808
Elongation at rupture before ageing	AS/NZS 3808
Tensile strength after ageing	AS/NZS 3808
Elongation at rupture after ageing	AS/NZS 3808
Loss of mass	AS/NZS 3808
Pressure test at high temperature	AS/NZS 3808
Heat shock	AS/NZS 3808
Exudation of plasticizer(loop test)	AS/NZS 3808
Insulation resistance constant at 20°C	AS/NZS 3808
Insulation resistance constant at 90°C	AS/NZS 3808
Insulation thickness	AS/NZS 5000.1
Minimum thickness of insulation	AS/NZS 5000.1
Earth conductor colouring	AS/NZS 5000.1
Oversheath	
Tensile strength before ageing	AS/NZS 3808
Elongation at rupture before ageing	AS/NZS 3808
Tensile strength after ageing	AS/NZS 3808
Elongation at rupture after ageing	AS/NZS 3808
Loss of mass	AS/NZS 3808
Pressure test at high temperature	AS/NZS 3808
Heat shock	AS/NZS 3808
Exudation of plasticizer(loop test)	AS/NZS 3808
Minimum thickness of oversheath	AS/NZS 5000.1
Complete cable	
Cable marking	AS/NZS 5000.1
High voltage a.c. test for 4h	AS/NZS 1660.3 Clause 3.2.1
Compatibility test	AS/NZS 5000.1
Single vertical cable combustion propagation test	AS/NZS 1660.5.6

Note: testing schedule was developed based on the manufacturer's statement the insulation, sheathing, and conductor materials used, are the same throughout the range.

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Specification and Clause Nos.	Clause Title	Actual Results Assessments, Remarks
AS/NZS 5000.1		
1	Scope	Noted
2	Referenced documents	Applied
3	Definitions	Noted
4	Voltage designation	Noted
5	Conductors (plain annealed copper)	Complied
6	Insulation	
6.1	Material (V-90)	
6.1.1	General	Complied
6.1.2	Aerial cables or fixed cables used in outdoor applications	Not applicable
6.2	Application	Complied
6.3	Thickness	Complied
6.4	Core identification	Complied
7	Assembly of cores	
7.1	Flat cables	Not applicable
7.2	Circular cables	
7.2.1	Lay-up of cores	Complied
7.2.2	Fillers, barrier tapes and binders	Complied
8	Bedding	Not applicable
9	Metallic layers	Not applicable
10	Separation layer	Not applicable
11	Armour	Not applicable
12	Metallic sheath	Not applicable
13	Oversheath	•
13.1	General	Applied
13.2	Material (5V-90)	Complied
13.3	Application	Complied
13.4	Thickness	Complied
14	Non-metallic braid	Not applicable
15	Protection from insect attack	Not applicable
16	Marking	

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Specification and Clause Nos.	Clause Title	Actual Results Assessments, Remarks
AS/NZS 5000.1		
16.1	Information to be marked	Complied
16.2	Means of marking	Complied
16.3	Legibility of marking on outer surface	Complied
16.4	Marking of packaging	Complied
17	Tests	Complied
AS/NZS 3808		· · · · · · · · · · · · · · · · · · ·
4	Materials	
4.1(r)	Insulating material	Complied
4.2(d)	Sheathing material	Complied
5	Tests and criteria	
5.2	PVC materials	Applied
Table 5(A, B, C, D, E, G,H)	Tests and criteria for PVC insulation	Applied
Table 6(A, B, C, D, E,G)	Tests and criteria for PVC sheath	Applied
AS/NZS 1125		
2.2	Material (Conductors shall be high conductivity copper wire complying with the chemical composition designation C 11000 in AS/NZS 1574.) Note: Compliance established from manufacturer statement that Cu content 99,90%.	Statement Complied
2.3	Form of conductor (the form of conductor is stranded circular non-compacted.) Note: Compliance established from manufacturer statement.	Statement Complied
2.4	Joints in conductors	
2.4.1	Joints in annealed conductors (When joining conductors by silver-soldering, resistance butt welding or fusion welding, no joint in a wire shall be closer than 60mm to that in any other wire in the same layer.) Note: Compliance established from manufacturer statement.	Statement Complied
2.6	Stranded conductors (class 2)	Complied
Table 2.1	Tests for plain or metal-coated copper conductors	Complied
AS/NZS 1660.1		
2.1	Elongation test of conductor	Applied

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Specification and Clause Nos.	Clause Title	Actual Results Assessments, Remarks
AS/NZS 1660.2.1		
2.1	Measurement of thickness and diameter	
2.1.1	Measurement of thickness of the insulation and extruded screens	
2.1.1.1	General	Applied
2.1.1.2	Apparatus	Applied
2.1.1.3	Preparation of test pieces	Applied
2.1.1.4	Measuring procedure	Applied
2.1.1.5	Evaluation of the measurement results	Applied
2.1.2	Measurement of thickness of non-metallic sheaths	
2.1.2.1	General	Applied
2.1.2.2	Apparatus	Applied
2.1.2.3	Preparation of test pieces	Applied
2.1.2.4	Measuring procedure	Applied
2.1.2.5	Evaluation of the measurement results	Applied
2.2	Tests for determining the mechanical properties of insulating and sheathing materials	
2.2.1	Insulating materials	
2.2.1.1	General	Applied
2.2.1.2	Sampling	Applied
2.2.1.3	Preparation of test pieces	Applied
2.2.1.4	Determination of cross-sectional area	Applied
2.2.1.5	Ageing treatment	In accordance with AS/NZS 1660.2.3
2.2.1.6	Conditioning of test pieces	Applied
2.2.1.7	Tensile testing procedure	Applied
2.2.1.8	Expression of results	Applied
2.2.3	Sheathing materials	
2.2.3.1	General	Applied
2.2.3.2	Sampling	Applied
2.2.3.3	Preparation of test pieces	Applied
2.2.3.4	Determination of cross-sectional area	Applied
2.2.3.5	Ageing treatment	In accordance with AS/NZS 1660.2.3

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Specification and Clause Nos.	Clause Title	Actual Results Assessments, Remarks
AS/NZS 1660.2.1		
2.2.3.6	Conditioning of test pieces	Applied
2.2.3.7	Tensile testing procedure	Applied
2.2.3.8	Expression of results	Applied
AS/NZS 1660.2.3		
2.1	Thermal ageing	
2.1.1	Ageing in an air oven	
2.1.1.1	General	Applied
2.1.1.2	Test equipment	Applied
2.1.1.3	Procedure for prepared test pieces	Applied
2.1.1.4	Procedure for pieces of complete cable	Applied
2.1.1.5	Compatibility	Applied
2.2	Loss of mass test	
2.2.1	Apparatus	Applied
2.2.2	Sampling	Applied
2.2.3	Preparation of test pieces	Applied
2.2.4	Calculation of the evaporation area A	Applied
2.2.5	Test procedure	Applied
2.2.6	Expression of results	Applied
2.3	Pressure test at high temperature	
2.3.1	Test for insulation	
2.3.1.1	Sampling	Applied
2.3.1.2	Preparation of test pieces	Applied
2.3.1.3	Position of each test piece in the test equipment	Applied
2.3.1.4	Calculation of the compressing force	Applied
2.3.1.5	Heating of the loaded test pieces	Applied
2.3.1.6	Chilling of the loaded test pieces	Applied
2.3.1.7	Measurement of the indentation	Applied
AS/NZS 1660.2.3		
2.3.2	Test for sheaths	
2.3.2.1	Sampling	Applied
2.3.2.2	Preparation of test pieces	Applied

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Specification and Clause Nos.	Clause Title	Actual Results Assessments, Remarks
AS/NZS 1660.2.3		, , , , , , , , , , , , , , , , , , , ,
2.3.2.3	Position of each test piece in the test equipment	Applied
2.3.2.4	Calculation of the compressing force	Applied
2.3.2.5	Heating of the loaded test pieces	Applied
2.3.2.6	Chilling of the loaded test pieces	Applied
2.3.2.7	Measurement of the indentation	Applied
2.4	Heat shock test (for resistance to cracking)	
2.4.1	Insulation	
2.4.1.1	Sampling	Applied
2.4.1.2	Preparation of test pieces	Applied
2.4.1.3	Winding of the test pieces on mandrels	Applied
2.4.1.4	Heating and examination	Applied
2.4.2	Heat shock test for sheaths	
2.4.2.1	Sampling	Applied
2.4.2.2	Preparation of test pieces	Applied
2.4.2.3	Winding of the test pieces on mandrels	Applied
2.4.2.4	Heating and examination	Applied
2.6	Exudation of plasticizer(loop test)	
2.6.1	General	Applied
2.6.2	Sample preparation	Applied
2.6.3	Procedure	Applied
2.6.4	Report	Applied
AS/NZS 1660.3		
3.2.1	Voltage test for cables rated $\leq 0.6/1$ kV (excluding flexible cords)	
3.2.1.1	High voltage a.c. test for 4h	Applied
3.3	Insulation resistance constant tests for cables up to and including 0.6/1 kV (excluding flexible cords)	
3.3.1	Measurement at ambient temperature	Applied
3.3.2	Measurement at elevated temperature	Applied
3.3.3	Calculation of insulation resistance constant	Applied
AS/NZS 1660.5.6		
Method 5.6	Fire tests-Test for vertical flame propagation for a single insulated wire or cable	Applied

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Test items	Pass criteria	Technical	Prescribed	W II I
		requirements	Red	Verdict
Nominal cross-sectional area (mm <sup>2</sup> )			630	
Diameter of wires in conductor (mm)			0.00	
AS/NZS 5000, 1 · 200	5 + A1, 2006 C1a	150.5	2.93	
Conductor			plain annealed copper	
Number of wires in the conductor Conductor resistance	AS/NZS 1125 Table 2.3	Min. 91	91	Pass
(20°C) Conductor elongation	AS/NZS 1125 Table 2.3	Max. 0.0283Ω/km	0. 0280	Pass
at rupture	AS/NZS 1125 Table 2.1	Min. 22 %	26	Pass
AS/NZS 5000.1: 2003	5 + A1: 2006 Clau	se 6.1.1		
Insulation	AS/NZS 3808 Table 5		V-90	
Tensile strength				
Elongation at rupture		Min. 12.5 N/mm <sup>2</sup>	18.7	Pass
before ageing		Min. 150 %	260	Pass
ageing in air oven (115 °C, 21×24h)				
Tensile strength after				
ageing Flongation at muntume		Min. N/mm²	17.8	
after ageing		Min %	262	
Tensile strength , percentage of value		//		
specimens		Min. 75 %	95	D
Elongation at rupture, percentage of value			50	Pass
specimens		Min. 65 %	101	Pass
120h)		Max. 2.5 mg/cm <sup>2</sup>	0.4	Pass
Pressure test at high				1 4 5 5
temperature $(90 \text{ C}, 4n)$		Max. 50 %	20	Pass
Heat shock (150 C, 1h)		No cracks	No cracks	Pass
Insulation resistance constant				
At 20℃		Min. 40 GΩ•m	59	Pass
At 90℃	]	Min. 0.002GΩ •m	0.04	Pass

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	T	T		I	
Test items	Pass critorio	Technical		Prescribed	Veredict
		re	quirements	Red	veruici
AS/NZS 5000.1: 200	5 + Al: 2006 Clau	ise 6.	3		
Insulation thickness	AS/NZS 5000.1				
	Table 1	Min.	2.8 mm	3.0	Pass
Minimum thickness of	AS/NZS 5000.1				
insulation	Clause 6.3	Min.	2.42 mm	2.88	Pass
AS/NZS 5000.1: 200	5 + A1: 2006 Clau	ise 13	3.2		
Oversheath	AS/NZS 3808 Table 6			5V-90(black)	
Tensile strength					
before ageing		Min.	12.5 N/mm²	16.1	Pass
Elongation at rupture					
before ageing		Min.	150 %	220	Pass
Mechanical tests					
after ageing in air					
oven $(115 C, 21 \times 24h)$					
after againg		Min.	N/mm <sup>2</sup>	16.4	
Florgation at					
runture after agoing		Min	0/	202	
Tensile strongth		M 1 11.	70	223	7 
percentage of value					
found in the unaged					
specimens		Min.	75 %	102	Pass
Elongation at rupture,	14 바이 전 전 아이 승규는				
percentage of value					
found in the unaged			05 0		
Loss of mass (115°C		M1n.	65 %	101	Pass
120h)		Max.	2.5 mg/cm <sup>2</sup>	0.3	Pass
Pressure test at high					
temperature (90°C, 6h)		Max	50 %	20	Pass
Heat sheet $(150\% 1b)$		NICENT.	00 //	20	1 455
neat snock (150 C , 1n)		No cr	acks	No cracks	Pass
AS/NZS 5000.1: 2005	+ A1: 2006 Claus	se 13	. 4		
Minimum thickness of	AS/NZS 5000.1	1.1			
oversheath	Clause 13.4	Min.	1.77 mm	2.76	Pass
	and the second		and the second sec		

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Toot itoma	D	Technical	Prescribed	Τ				
lest items	Pass criteria	requirements	Red	- Verdict				
AS/NZS 5000.1: 200	AS/NZS 5000.1: 2005 + A1: 2006 Clause 16							
Marking	AS/NZS 5000.1 Clause 16							
Information to be marked		(a)A registered name or						
		registered mark (b)Year of	ОК	Pass				
		manufacture (c)Designation of	2013	Pass				
		insulation (d)The words "ELECTRIC CABLE" and the voltage	V-90	Pass				
		rating (f)Conductor material and conductor nominal cross-sectional	OK	Pass				
The distance between the end of one block of marking and the beginning of next		area	Cu 630mm <sup>2</sup>	Pass				
AS/NZS 5000.1: 2005	+ A1: 2006 Tab	le 6		Pass				
High voltage a.c. test for 4h (1800V) Mechanical tests after compatibility test of insulation (100 $^{\circ}$ , 10 $\times$ 24h)	AS/NZS 5000.1 Table 6 AS/NZS 5000.1 Table 6	No breakdown	No breakdown	Pass				
ageing Elongation at		Min. N/mm²	18. 2					
rupture after ageing Tensile strength , percentage of value		Min. %	261					
specimens		Min. 75 %	97	Pass				

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Test items	Pass criteria	Technical	Prescribed	
AS/NZS 5000.1: 2005 + A1: 2006 Table 6 (continued)				
Elongation at rupture, percentage of value found in the unaged specimens Mechanical tests after compatibility test of oversheath $(100 \degree C, 10)$ $\times 24b)$	AS/NZS 5000.1 Table 6	Min. 65 %	100	Pass
Tensile strength after ageing		Min. N/mm²	15. 5	
after ageing Tensile strength ,		Min. %	228	
found in the unaged specimens Elongation at rupture, percentage of value		Min. 75 %	96	Pass
found in the unaged specimens Single vertical cable combustion	AS/NZS 5000.1 Table 6	Min. 65 %	104	Pass
Distance between the lower edge of the top support and the onset of charring Distance between the point that charring extends downwards to and the lower edge of		Min. 50 mm	368	Pass
the top support		Max. 540 mm	490	Pass
Checking of the falling particles		Any falling particles shall not ignite the filter paper		
		underlay	OK	Pass

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#### photo of the sample:



#### **APPENDIX:**

- 1. Place of test ( if not the same with the address of this report ): \_\_\_\_\_
- 2、Add.&Postcode: No. 239, Zhonghuan Road East, Airport Economic Zone, Tianjin 300308, P.R. China
- 3、Testing ambient conditions:

Temperature: (20~25) °C, Relative humidity: (45~75) %, Others: \_\_\_\_\_

- 4. Sampling procedure ( if applicable ):\_\_\_\_\_
- 5、Statement of deviating standard method ( if applicable ) :\_\_\_\_\_
- 6. Uncertainty statement of test results ( if applicable ):\_\_\_\_\_
- 7. Subcontracted items and subcontractors ( if applicable ):\_\_\_\_\_

—End—

#### **Overview of GQI**

Guangdong Testing Institute of Product Quality Supervision (In short GQI), also called Guangzhou Electrical Safety Testing Institute of State Bureau of Quality and Technical Supervision, Guangdong Testing and Certification Institute, was set up in September, 1983. It is a legal third party institute specializing in product testing and certification; it is affiliated to General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) and Guangdong Bureau of Quality and Technical Supervision; it is a nationallevel testing and inspecting organization accredited by China National Accreditation Service for Conformity Assessment(CNAS); it is an international CB testing laboratory recognized by International Electrotechnical Commission System of Conformity Assessment Schemes for Electrotechnical Equipment and Components(IECEE); it is the national compulsory CCC testing and inspecting organization designated by Certification and Accreditation Administration of the People's Republic of China (CNCA); it is also the contractual laboratory with China Quality Certification Center (CQC) and other national-level organizations. With one headquarter and two testing bases, GQI possess laboratory and office areas of around 60000 square meters with fixed asset exceeding 500 million RMB. It is staffed with over 660 high-quality technical professionals of various fields and administrative staff, and equipped with more than 8,000(set) advanced testing and calibration instruments and equipments, and it has already obtained nationally and internationally accredited qualifications of more than 2,300 items. GQI is a professional and authoritative testing and certification organization with domestically and internationally advanced level, which integrates testing, factory inspection, calibration, certification, standards setting and amendment, and scientific research together.

GQI currently undertakes commitment of 8 national supervision and testing centers and 13 provincial supervision and testing centers, which are:

China National Quality Supervision and Testing Center for Safety of Electrical Products

China National Quality Supervision and Testing Center for Furniture (Guangdong)

• China National Quality Supervision and Testing Center for Medium and Low voltage Transmission and Distribution Products

• China National Quality Supervision and Testing Center for Paintings and Dopes (Guangdong)

China National Quality Supervision and Testing Center for Risk Evaluation of Food Safety (in construction)

China National Quality Supervision and Testing Center for Machinery Safety (in construction)

China National Quality Supervision and Testing Center for Fire Fighting Products (in construction)

China National Quality Supervision and Testing Center for Solar Energy Photovoltaic Products (in construction)

#### Provincial supervision and testing centers include:

♦ Guangdong Quality Supervision and Testing Station for Toys

♦ Guangdong Quality Supervision and Testing Station for Cables and Wires

♦ Guangdong Quality Supervision and Testing Station for Fire Fighting Electronic Products

♦ Guangdong Quality Supervision and Testing Station for Fire Fighting Products

♦ Guangdong Quality Supervision and Testing Station for Air-conditioner (Shunde)

◊Guangdong Quality Supervision and Testing Station for Machinery Safety

◊Guangdong Quality Supervision and Testing Station for Gene Modification Food and Food Poisonous Element

◊Guangdong Quality Supervision and Testing Station for Electrical Bicycles

 $\Diamond$ Guangdong Quality Supervision and Testing Station for Battery

♦ Guangdong Quality Supervision and Testing Station for High-voltage Transmission and Distribution Equipment

♦ Guangdong Quality Supervision and Testing Station for Textile Products

♦ Guangdong Quality Supervision and Testing Station for Solar Energy Photovoltaic Products(in construction)

♦ Guangdong Quality Supervision and Testing Station for Gold, Silver, Jewels and Jades