SECRET/CLASSIFIED	NUMBER Ty 16-505-911-76
	SHEET 1 OF 32
	SUPERSEDES

I.2051

84/0848711-04-105 -40166 TA

T-95

A1

ALBUM NO: A-14

TECHNICAL DOCUMENTATION ON

ARTICLE dwg nr 34.368.008 TECHNICAL

SPECIFICATIONS:

Ty 16-505.911-76 On

32 SHEETS:

O.F.P.H. NO: I- 2051

TRANSLATED	P MALVIYA		25 1/85	Ordnance Factory Project Hyderabad.
AUTHENTICATED	A LEBEDEV			
TYPED	T.GIRI KUMAR		26 3/85	
EDITED	P.MURALEE-DHARAN			APPROVED
	NAME	SIGN.	DATE	

Ordnance Factory Project Hyderabad.		NUMBER..TY16.505.911-76
		SHEET....2.... OF ..37....

I-2051

WIRES WITH INSULATION FROM FLEXIBLE PVC IN

VARNISHED BRAIDING FOR VEHICLE MAINS.

TECHNICAL SPECIFICATIONS:

TY16-505.911-76.

—(SUPERSEEDS TY 0300 — 505-192-60 AND TY16-6-370-69)

VALID FROM JUNE 20th '1976.

VALID TILL JAN 1st 1984.

T-2051

The present technical specifications refer to wires with insulation from flexible PVC in ~~braid~~ braiding varnished for vehicle mains, herein after referred to as "WIRE".

Wires are intended for mounting in the vehicle electrical mains equipment and also for general prupose equipment at AC voltage upto 250V of a frequency upto 2000Hz or at DC 500V.

The list of documents which are ~~referred~~ mentioned to in the present technical specifications, is given in appnedix.

~~Example of designation for red colour wire of brand БПВЛ with a cross-section of 0.35mm2 while placing its order and in documentation of another article:~~

~~"Wire БПВЛ 0.35 for ТУ 16-505-911-76"~~

Example of designation of red colour wire of brand БПВЛ with index "0" with a cross-section of 0.35mm2 while placing its order and in documentation of another article:

"Wire БПВЛ 0.35 for ТУ 16-505-911-76"

1. TECHNICAL REQUIREMENTS:

1.1 Wires should correspond to the requirements of the present technical specifications.

1.2 Brands and dimensions ~~of the following brands~~

1.2.1 Wires are manufactured of the following brands:

БПВЛ - varnished wire, with a copper tinned core, insulated with a flexible PVC in a cotton yarn, braiding intended for vehicle mains.

I.2051

БПВЛЭ - ditto screened wire

БПВЛА -varnished wire with analuminium cores, insulted with flexible PVC in a cotton yarn braiding intended for vehicle mains.

БПВЛМ -Miniature varnished wire, with a copper, tinned core, insulted with flexible PVC in a combined braiding of glass and carbon threads intended for vehicle mains.

БИВЛМЭ -ditto screened wire.

1.2.2 Nominal cross-section the number and diameter of wire-conductors DC resistance of a current carrying core radial thickness of insulation, maximum external diameter of a wire should correspond to table 1 for brands БПВЛ БПВЛЭ, БПВЛА and table 2 for brands БПВЛМ and БПВЛМЭ

Wires БПВЛ-О, БПВЛЭ-О are supplied according to orders of organizations and departments having the right to order the articles with distinguishing index"O".

T.2051

Table:1

Core nominal cross-section mm2	The number and diameter of a wire conductor MM	Core DC resistance max ohm/km	Insulation nominal thickness mm	Wire maximum external diameter MM			Wire calculated mass kg/km		
				Бпвл	Бпвлэ	Бпвлн	Бпвл	Бпвлэ	Бпвлa
0.35	7x0.26	58.0	0.35	2.4	3.1	-	71.	20	-
0.5	7x0.30	41.3	0.4	2.7	3.3	-	8.9	23	-
0.75	7x0.37	26.8	0.4	2.9	3.5	-	11.8	29	-
1.0	19x0.26	20.5	0.45	3.2	3.8	-	16.5	33	-
1.5	19x0.32	13.3	0.5	3.6	4.4	-	23	61	-
2.5	19x0.42	8.0	0.5	4.1	5.0	-	35	68	-
4.0	7x7x0.32	5.0	0.5	5.0	5.8	-	50	86	-
6.0	7x11x0.32								
	11x7x0.32	3.3	0.5	6.2	7.0	-	73	117	-
10.0	7x13x0.37								
	13x7x0.37	2.0	0.6	7.4	8.6	-	127	198	-
16.0	7x12x0.49								
	12x7x0.49	1.2	0.6	8.7	9.9	-	179	263	-
25.0	7x19x0.49								
	19x7x0.49	0.8	0.6	10.0	11.2	-	270	360	-
35.0	7x27x0.49								
	27x7x0.49	0.57	0.8	11.9	13.1	-	372	479	-
	37x1.1	0.848	0.6	-	-	10.8	-	-	134
50.0	37x7x0.49								
	19x14x0.49	0.4	0.8	13.6	15.0	-	515	634	-
	37x1.3	0.607	0.6	-	-	1.23	-	-	179
70.0	7x27x0,68								
	27x7x0.68								
	19x10x0.68	0.29	0.8	16.6	17.3	-	695	829	-
	61x1.2	0.432	0.6	-	-	14.2	-	-	243.6
95.0	37x7x0.68								
	19x14x0.68	0.20	0.8	17.9	19.0	-	952	1100	-
	61x1.4	0.317	0.7	-	-	16.4	-	-	326

T.2051

Table:2

Core nominal cross-section mm2	The number and diameter of a wire conductor MM	Core DC resistance max Ohm/km	Insulation nominal thickness MM	Wire maximum external diameter MM		Wire calculated mass kg/km	
				БПВЛМ БПВЛМЭ	БПВЛ БПВЛЭ	БПВЛМ	БПВЛ БПВЛЭ
0.35	7x0.26	58.0	0.3	2.1	2.6	6.2	12.5
0.5	7x0.30	41.3	0.35	2.3	2.8	8.1	15.0
0.75	7x0.37	26.8	0.35	2.5	3.0	11.0	18.5
1.0	19x0.26	20.5	0.4	2.8	3.3	14.3	23.0
1.5	19x0.32	13.3	0.45	3.2	3.7	20.6	30.0
2.5	19x0.42	8.0	0.45	3.7	4.3	32.1	46.0

NOTE: 1. Deviation from nominal thickness of insulation should not exceed :
minus 0.05MM for wires of grade БПВЛМ, БПВЛМЭ
minus 0.05MM for wires of brands БПВЛ, БПВЛЭ, БПВЛА with cross-sections from 0.35 upto 1.0mm^2.
minus 0.1MM for cross section of 1.5mm^2 and above
plus tolerance is not to be standardized.

2. Calculated mass is stated as a reference value

3. 2 and 3 insulated wire ~~stands~~ of the same cross-section (upto 1.0mm^2) may be made in a common screen on agreement of the parties. Seperate insulated cores of a wire should correspond to the requirements of the present technical specifications.

1.2.3 A face-to-face length of a wire for БПВЛ, БПВЛЭ, БПВЛМ and БПВЛМЭ should be not less than 15m, for БПВЛА -not less than 10M.

T-2051

It is allowed to deliver wires atleast 5M long in amounts of not more than 10% of the total length ofthe batch to be delivered.

On parties agreement wires of any length may be delivered.

1.3 Requirements for design.

1.3.1 A current carrying core of wires БпвЛ, БпвЛЭ, БпвЛМ and БпвЛМЭ should be made of copper tinned wire-conductors and should correspond as per design to GOST 1956-70 and table 1 of the present technical specifications.

A current carrying core of wire БпвЛА should correspond to GOST 12137-66 type П , designs, stated in brackets.

Non-conformity of a diameter of seperate conductors with specified values for all cross-sections as well as ommission of seperate wires conductors in a core of a cross section of 4.0ММ^2 and above, is not to be considered a symptom of rejection, if electrical DC resistance of the core does not exceed the value, shown in table 1 and table 2.

Presence of partially nontinned wire conductors, in amounts of not more than 2 in any cross-section ofa core is allowed.

Seperate wires may be soldered or welded.

Wire conductors should be soldered or welded at a distance of not less than 200мм from each other.

~~Soldering or welding of cross strands in one cross-section.~~

Soldering or welding of strands in one cross-section is allowed in ~~account~~ current carrying core made of tinned copper wire conductors, twisted from strands.

Welding or soldering of a core in one cross-section is not allowed.

1.3.2 A current carrying core should be insulated with flexible PVC.

1.3.3 A braiding made of antiseptic twisted cotton yarn should be applied over insulation of wires of brands БПВЛ, БПВЛЭ and БПВЛА

Coefficient of braiding surface compactness should be not less than 90%.

A braiding of combined leas consisting of glass and capron threads, shou'd be applied over insulation of wires of brands БПВЛМ and БПВЛМЭ. Coefficient of braiding surface compacness should not be less than 95%.

In case of threads breakage they should be cut short. Loops and knots which do not get the external wire diameter beyond the limits stated in table 1 and table 2. are allowed.

Ommission of a braiding strand over a length of 0.5m and not more than 5 small contaminators over a length of not more than 200m., are allowed on a face-to-face length of a wire.

Presence of seperate grey threads in white colour braiding is not to be a symptom of rejection.

Т, 2051

1.3.4 Wires should be manufactured with continuous colouring of the braiding.

Wire colour should be specified in the order and should have the following designation.

Colour	Colour index in letters.
White	Б
Blue	Г
Yellow	Ж
Red	К

Difference of hues of the basic colour of a braiding is allowed.

In case, wire colour is not specified in order, wires of any colour may be delivered.

Other methods of colouring the wires are allowed as per agreement with the developing plant.

Wires of brands БПВЛМ and БПВЛМЭ are made of white colour. Wires БПВЛМ and БПВЛМЭ may be ~~colo~~-coloured by introduction of coloured capron threads in their braiding.

1.3.5 Braiding of wires БПВЛ, БПВЛЭ and БПВЛА should be coated with ethyl cellulose or nitro-cellulose lacquers.

Combined braiding of wire БПВЛМ and БПВЛМЭ should be coated with polyamide lacquer.

1.3.6 A screening braiding should be made of tinned copper wires conductors with a diameter of 0.12 to 0.26mm.

T. 2051

Wire conductors ends or braiding strands nds in loaming up or breakage points should be cut short. Ommission of a braiding strand over a length of upto 4 pitches is not to be a symptom of rejection when a strand of reverse direction is present.

Surface compactness coefficient of a screening braiding should be not less than 70%.

1.3.7 A distinguishing thread of the manufacturing plant should be present on all the wires. A distinguishing thread may be introduced in the braiding as a braiding strand over the basic hue except, wires brown and brown.

1.3.8 Materials used for manufacturing wires should correspond as stated below:

A tinned copper sire conductor	Ty 16-505.850-75
An aluminium wire conductor of brand AT	to OCT 6132-71
Silver solder	to GOST 8190-56
Tin	to COST 860-60
Insulating flexible PVC of brand M - 40 . 14	to GOST 5 960-72 or equivalent
Cotton twisted antiseptic yarn	to TY 17 PC/CP(RSFSR)
~~Antiseptic yarn~~	4452-75
A glass thread	to TY6- 11-200-71 or equivalent
A capron stabilized shining thread of brand B of grade 1 or with state quality mark	to OCT 6-06- cr -75 or equivalent
Polyamide lacquer no 548	to MPTY 6-05-1033-66
Ethyl cellulose lacquer ЭЦ-959	to Ty6-10-691-74
lacquer ВЧ 995А	to Ty6-10-1362-73
A coloured ~~epiom~~ capron thread	to MPTY 6-06-214-69.

1.4 Requirements for electrical parameters.

1.4.1 Electrical DC resistance of current carrying cores brought to a temperature of 20^{o}c, should correspond to the resistance; shwon in table 1 and 2.

1.4.2 Insulated cores of wires should withstand the testing AC voltage of 4000V of a frequency of 50Hz on a dry test apparatus.

1.4.3 Wires should withstand testing AC voltage of 500V of frequency of 50Hz for 1 minute.

1.4.4 Insulation resistance of wires brought to a temperature of 20^{o}c, for cross-sections upto 4mm^2. should be not less than 500 megohm M, for cross-sections above 4mm^2 not less than 10 meg Ohm M .

1.5 Requirements for resistance(strength) on exposure to mechanical load effects.

1.5.1 Wires should be strong and should accept operation on exposure to the following mechanical loads;

a) vibration in a frequency range from 5 to 2000Hz with an acceleration upto 20g.

b) Multiple impacts with an acceleration upto 150g at impact duration from 1 to 3 mc,

c) linear loads with an acceleration upto 150g.

1.6 Requirements for mechanical parameters.

1.6.1 Wires of brands БПВЛМ should be resistant to attrition. In supplying condition the number of double travels of a needle of a diameter of 0.6 mm at a load of 600g till complete attrition should not be less than:

I-2051

3000-for cross-section of 0.35 and 0.5 mm²
5000-for cross-section of 0.75 and 1.0 mm²
8000-for cross-section of 1.5 and 2.5 mm²

1.7 Requirements for resistance on exposure to climatic conditions

1.7.1 Wires should be resistant to the effect of an elevated temperature of 70°c which is formed from an ambient temperature and a temperature created by load current.

1.7.2 Wires should be resistant to a reduced temperature down to -60°c(in case of ffixed wiring)

1.7.3 Wires should be resistant to the effect of a relative air humidity upto 98% at a temperature of 40°c.

1.7.3 Wires should be resistant to change in a temperature from -60 to +70°c.

1.7.5 Wires sh uld ba resistant to the effect of a reduced atmospheric pressure down to 6.710 ^{2} Pa (5mm Hg)

1.7.6 Wires of brand [illegible] should be resistant to the effect of increased atmospheric pressure upto 3 atm for 20 min.

1.7.7 Wires should have resistance to the effect of gon oil and petrol mixture for 6 hours.

1.7.8 Wires should be low inflammable and a flame propagation velocity should be not more than 55MM per 30 S.

1.8 Requirements for resistance on exposure to effect of destabilizing factors.

I. 2051

1.8.1 Wires should maintain serviceability during and after the effect of the factors of types 1 and 2 for III group of articles as per standard HO.005.058, in this case, electrical parameters should be within the following limits:

Insulation resistance of wires-of not less than 0. 5 meg ohm M for corss-sections upto 4.0 mm^2 and of 0.01 meg ohm M for cross-sections over 4.0 mm^2 (on exposure to the factors of type 1-0.0001 megohm/m). Testing voltage-500V AC of a frequency of 50Hz for 1 min.

1.8.2 Wires БПВЛ-О and БПВЛА-О may be exposed to the effects of corrosive medium vapours of ~~acid~~ components. Their content air, should not exceed sanitary norms for amyl-not more than 0.005mg/l for heptyle-0.000mg/l total ~~residence~~ standing time of wires in the specified conditions should not exceed 6 months.

1.9 Requirements for relaibility.

1.9.1 a) An operating time of wires in modes and conditions permissible by the present technical conditions should not be less than 10,000 hours.

REMARKS: An operation time of wires of brands БПВЛМ and БПВЛАМ for electrical mains of civil aviation aeroplanes should not be limitted by the alue shown in item 1.9.1a and is determined by technical conditions of the wire, by the end of its operating time:

b) An operating time of wires БПВЛ and БПВЛА for electrical mains of civil aviation aeroplane should not be less than 25000 hours, on exposure to a temperature below 70°c, and if the wires are protected from continuous effect of oil, petrol fuel mixture acids and other corrosive media and also when not exposed to banding, twisting etc during operation

I.2051.

1.9.2 a) ~~A wires~~ of wire service life within which their operating time is ensured and the valye of which is shown in item 1.9.1a as well as their quality keeping term (item 1.9.3) should be not less than 12 years.

REMARK: Service life of wires of brands БПВЛ and БПВЛЭ for electrical mains of civil aviation aeroplanes is not restricted by that shown in item 1.9.2a and is determined by technical conditions of wires by the end of their service life.

b) Service life of wires БПВ, БПВЛЭ, БПВЛА within which their operating life is ensured and the value of which is shown in item 1.9.1b as well as their quality keeping term (R1.9.3) should be not less than 15 years.

1.9.3 A quality keeping term of wires in case of storing in heated rooms, in supplier's packing and when mounted on equipment and also in a SPTA set should be not less than 12 years for the wires with a service life and operating time shown in item 1.9.1a and 1.9.2a and not less than 15 years for the wires with a service life and operating time shown in items 1.9.1b and 1.9.1b ~~отш~~ out of which in field conditions (under a shed, in an open area- not less than 5 years as components of equipment and a SPTA set, if protected from direct effect ofsolar radiation atmospheric precipitations and corrosive ~~needs~~ a media.

1.10 Requirements for marking

1.10.1 Content of marking on drums or lables fixed to a drum or a wire bundle should correspond to GOST 18690-73 ~~1-11 Requirements for packing.~~

1.11 Requirements for packing.

1.11.1 Packing of wires should correspond to GOST 18690-73 for conditions of transportation and storage, stated in the present technical specifications. Not more than 3 sections of wire of the same brand, cross-section and colour should be on one drum or in a bundle.

2. Quality check.

2.1 Requirements for provision and check of wires quality during production.

2.1.1 Requirements for provision and check of wires quality during production should correspond to GOST B 18370-73.

2.2 Acceptance rules.

2.2.1 Acceptance should be carried out in accordance with the requirements of GOST B18370-73 with amendments and addenda presented in the given sub section.

While supplying wires without acceptance by the consumers representative, their acceptance should be carried out by TID of the manufacturing plant in accordance with OST 16.0.800.230.75 with amendments concerning types and a plan of check periodicity of tests, acceptance and periodical tests programmes, given in the present subsection.

2.2.2 Batches, submitted for acceptance are to be checked as per the plan of usual random, single step check in the scope according to table 3 at an acceptance number being equal to 0.

T-2051

The quantity of wire of one brand size simulatneously submitted for tests, but not more than 20km, us considered to be a batch.

Table: 3

Description of checkings and tests	Items of technical specifications: Requirements	Items of technical specifications: Methods	Minimum ~~supplying~~ sampling from a batch to be submitted.
1. Wires design checking			
a) core design checking	1.2.2 1.3.1	3.2.1	5% but minimum 3 bundles
b) thickness of insulation checking	1.2.2 1.3.2	3.2.1	"
c) external diameter checking	1.2.2	3.2.1	10%
d) appearance inspection	1.3.3 1.3.4 1.3.5 1.3.6	3.2.2	10%
2. Core de resistance checking	1.2.2 1.4.1	3.3.1	2%but minimum 3 bundles
3. Voltage testing of wires БОВЛЭ, БПВЛМЭ in normal climatic conditions	1.4.3	3.3.3	10%
4. Checking of insulation resistance of wires БПВЛЭ, БПВЛМЭ in normal climatic condition	1.4.4	3.3.4	5% byt minimum 3 bundles
5. Marking packing inspection ~~check as per items 1.3.3 and 1.3.6~~	1.10.1 1.11.1	3.8.1	10%

Check as per items 1.3.3 and 1.3.6 (concerning compactness of a braiding and screen), 1.4.2 is to be carried out during production.

T.2051

For every batch of wires accepted by the customers representative, there should be drawn up a certificate in 3 copies, signed in set order. One copy of the certificate is to be sent to the consumer along with a batch of wires and two copies are to remain in a customer representative office and at the manufacturing plant.

2.2.3 Periodic tests should be carried out once in every 6 months on the same samples for each testing group as per programme and sequence given in table 4.

Conformity with the requirements of item 1.3.8 is to be tested once in every 3 months, and with items 1.4.3, 1.4.4 (for unscreened wires) not less than once in a month tests are to be carried out as per a plan of double step random check at an acceptance number for the total sampling being equal to 0.

Volume of a sampling for test groups 1 to 4 should be $n_1 = 10$ and $n_2 = 20$ samples. (5 and 10 samples respectively of two extreme cross-sections of the out-put during the period to be checked).

For the 5th test group the volume of a sampling should be $n_1 = 3$ and $n_2 = 6$ samples of each cross-section. Before starting periodical tests, the samples of the submitted sam;ling should be subjected to the check in scope of the accptance tests in accordance with table 3.

Table: 4

Description of checkings and tests	Items of technical specifications	
	Requirements	Methods
Ist test group:		
1. Voltage testing of wires in normal climatic conditions	1.4.3	3.3.3

Description of checkings and tests	Items of technical specifications. Requirements	Methods
2. Insulation resistance checking of wires бпбл, бпвлл, бпвлм in normal climatic conditions &	1.4.4	3.3.4
2nd test group		
1. Heat resistance checking	1.7.1	3.6.1
3rd test group		
1. Cold resistance checking	1.7.2	3.6.2
4th test group		
1. Low inflammability checking	1.7.8	3.6.8
5th ~~the~~ test group		
1. Attrition resistance checking of wires ~~Analysis of defects, detected during periodical tests should.~~	1.6.1	3.5.1

Analysis ~~Attrition resistance~~ of defects, detected ruing periodic tests should be started as soon as they are detected.

If defects of a samples are detected in sampling n_1 manufacturer and the customer's prepresentative should analyse the defects before starting the test of sampling n_2 or not later then on finishing the test sampling n_2 if the analysis requires long time tests

On the basis of analysis results, manufacturer and the customer's representative take a decision about necessity and terms of measures of wire defects cuases elimination to be developed and introduced into production.

2.2.4 Tests as per items 1.5.1,1.7.3-.17.8 are to be carried out as a part of qualφfying and type tests.

E.12051

Conformity with the requirements of items 1.8.1 and 1.4.2 should not be checked, but should be ensured by the design of wires and by properties of the materials used.

2.2.5 Tests for durability are to be carried out as a part of qualifying and type tests as per methods, approved in set order, and in batch production-not less than once every 2 years as per method of item 3.7.1.

2.2.6 A quality keeping term test (item 1.9.3) should be carried out by the manufacturing plant jointly with the customers representative in accordance with methods of item 3.7.2 of the present technical specifications.

3. TESTING METHODS:

All tests, if there are no special instructions in their description should be carried out in normal climatic conditions as per GOST 16962-71.

3.2 Checking of conformity with design requirements

3.2.1 Elements of a design and designed dimensions (items 1.2.2,1.3.1,1.3.2,1.3.3,1.3.6) are to be checked in accordance with GOST 12177-72 with the help of a vernier caliper and a micrometer.

3.2.2 Quality of wire insulation surface and screen or braiding appearance (items 1.3.3,1.3.4,1.3.5,1.3.6) are to be checkee viaually without using magnifying devices.

3.3 Checking for conformity with requirements for electric parameters.

3.3.1 Electrical DC resistance of current carrying cores (items 1.2.2,1.4.1) is to be checked as per

I.2051

GOST 7229-67.

3.3.2 Insulated cores voltage test on dry test apparatus (item 1.4.2). is to be carried out as per GOST 17397-71.

3.3.3 Voltage test in normal climatic conditions(item 1.4.3) of wires of brands БпВлэ, БпВлпэ is to be carried out over face-to-face lengths and of wires of brands БпВл, БпВлА, БпВлАМ on samples of not less than 1.5 long after holding for 1 hour in water or enlcosed in a metal screen in accordance with GOST 2990-72.

3.3.4 Insulation resistance (item 1.4.4) for wires of brands БпВлэ, БпВлпэ is to be measured over face-to-face lengths, and for wires of brands БпВл, БпВлА, БпВлАМ on samples of not less than 1.5M long after holding for 1 hour in water or enclosed in a metal screen in accordance with GOST 3345-67.

3.4 Checking for conformity with requirements for resistance (strength) on exposure to mechanical loads.

3.4.1 Wire samples of not less than 1.5M long are to be subjected to a test as per item 1.5.1. Samples with a cross-section of upto 2.5mm² are to be coiled turn by turn on a metal rod of a diameter equal to 10 external diameters of the wire. Sample with a cross-section over 2.5mm² should be rolled up on plane bundles with a diameter of not less than 20 diameters of the wire.

The rods with the samples or the bundles should be tightly fixed to a vibration-testing machine table. The test is to be carried out within a frequency range from 5 to 1000Hz with an acceleration of 20g as per method 103-1 GOST 16962-71 without electrical load.

Total time for vibration effect should be not less than 3.5 hours. After the vibrated load effects test the sample are to be checked for continuity of the core and then the samples are to be tested with an AC voltage of 1500V. of a frequency of 50Hz for 1 minute.

REMARK: Up till the industry is equipped with the corresponding equipments, the tests are to be carried out, starting from a frequency of 20Hz.

3.4.2 A checking for multiple impacts affect(item 1.5.2) is to be carried out on wire samples of not less than 1.5M long. The test is to be carried out as per met od 104-1 GOST 16962-71. Preparation of samples for the test is to be carried out in accordance with item 3.4.1. The bundles or the rods with the samples should be tightly fixed to a vibration-on-testing machine table and are to be subjected to the effect of 4000 impacts with an acceleration of 150g with a momentum duration of 1 to 3 ms. After the expiry of the test the samples are to be checked for contuinity of the core and then they are to be tested with an AC voltage of 1500V of a frequency of 50Hz for 1 minute.

3.4.3 Checking for resistance to the effect of linear loads (item 1.5.3) should be carried out on samples of not less than 1.5M long in acco danc with method 107-1 GOST 16962-71 without electrical load. Samples for the test are to be prepared in accordance with item 3.4.1.

The bundle or the rods with the samples should be tightly fixed to a centrifugal platform and subjected to the effect of linear loads with an acceleration of 150g for 10 minutes. After the expiry of the tests, the samples are to be tested with AC voltage of 1500V of a frequency of 50Hz for 1 hour.

T.2051

3.5 Checking for the conformity with requirements for mechanical parameters.

3.5.1 Wires 6mm are to be checked for resistance to attrition on samples of not less than 600mm long each.

The test is to be carried out on a special installation with the help of a sweing needle of a diameter of 0,6mm(numbeCr 1 as per GOST 1170-65) with a pressing load of 600g. The needle should have 60±10 reciprocal motions per minute: Needle travel is to be of 8-11mm. Attrition is to be carried out by the sidesurfaces of the needle perpendicular to the axis ofthe wire.

The test is to be carried out in 4 places at a distance of not less than 100mm from each other:

As the sample is displaced every time it is to be turned 90° to one end the same direction.

The test is to be carried out till complete attrition of the braiding (till exposures of the flexible PVC) along the whole length of the needle travel.

An arithmetic mean of the number of two double travels of the needle from all the measurements for the same cross-sectionis to be taken as the result.

3.6 A checking for conformity with requirements for resistance on exposure to clamatic effects.

3.6.1 Heat resistance of wires (item 1.7.1) is to be checked by holding samples of not less than 0,3M long in a heat chamber at a temperature of 70±3°c for 6 hours in accordance with method 201-1 GOST 16962-71.

The samples of the wire to be tested are to be hung in the heat chamber in such a way that they do not touch the walls of chamber.

I.2051

After being taken out from the heat chamber, the samples are to be held for 15 minutes in normal conditions. Then the wires with a cross-section of 0.35 to 6.0mm² are to be tested by coiling the samples in three turns around a rod of a diameter, shown in table 5. The wires with a cross-section of 10 to 95mm² are to be tested by bending through 180° a round a rod of a diameter, shown in table 5.

Table:5

Nominal cross-section of a core mm²	Maximum diameter of a rod MM
0.35-2.5	5 d
4.0-6.0	6 d
10.0-35.0	8 d
50.0-95.0	10 d

where d- diameter of the wire to be tested, mm.

After the test there should be not cracks and breakages visible with the necked eye on a varnish film.

3.6.2 Cold resistance of wires (item 1.7.2) is to be tested in accordance with method 203-1 GOST 16962-71 on samples of not less than 0.8M long.

A sample, bent through an angle of 180° around a cylinder with a diameter, shwon in table 5, is to be placed in a cold chamber with a temperature of 60±2°c for three hours.

After being taken out from the cold chamber, these should be no cracks and breakages visible with the naked eye on a sample surface.

T.2051

After checking the appearance the samples are to be tested with voltage AC of 1500V of a frequency of 50Hz for 1 minute.

REMARK 1. While testing cold resistance of wires БПВЛЭ, БПВЛМЭ screening braiding is to be removed from the samples.

2. While checking dismounted wires or wires taken from storage, the test are to be carried out as per methods, shown above at a temperature of -50°c;

3.6.3 An effect of temperature chenge (item 1.7.3) is to be checked on samples of not less tha n 1M long with a cross-section of upto 2.5mm², coiled on a metal rod of a diameter equal to 10 diamters of the wire. Wires with a cross-section above 2.5mm² as well as screened wires are to be tested being rolled up onto bundles of a diameter of not less than 20 diameters of the wire. The test is to be carried out in accordance with method 205-1 GOST 16962-71.

The samples are to be subjected to 3 cycles of temperature effect from +70 to -60°c.

Samples holding time at every stage of the cycle should be 1 hour. After 3 cycles the samples are to be taken out, visually inspected and tested with an AC voltage of 1500V of a frequency of 50Hz for 1 min.

3.6.4 Wires are to be checked as per item 1.7.4 on samples ofnot less than 1.5 M long by method 207-1 GOST 16962-71. Before testing the samples are to be checked. For conformity with the requirements of item 1.4.4 of the present technical specifications. Unscreened samples are to be coiled on metal cylinders of a diameter, shown in table 6. Length of the coiled part should be not less than 1M. Wires with a cross-section above 4mm² are to be tested. Screend Braiding should be removed from the end of the wire of a

length of not less than 150mm. The samples are to be placed in a humidity chamber with the ends, brought outside.

Table:6

Wires nominal cross section mm 2	Cylinder diameter, mm
0.35–2.5	30
4.0	50

The samples are to be held for 48 hours at a relative air humidity upto 98% and a temperature of $40 \pm 2^{o}c$.

Insulation resistance is to be measured in medium with a relative humidity of98% at a temperature of $20 \pm 5^{o}c$ in accordance with GOST 3345-67.

In this case resistance values should correspond to those specified in item 1.4.4.

3.6.5 Resistance of wires to reduced atmospheric pressure (item 1.7.5) should be checked on samples of not less than 1.5M long as per method 209-1 GOST 16962-71. Wires with a cross-section of upto $2.5mm^2$ are to be tested unscreened and coiled turn by turn on a metal rod with a diameter equal to 10 external diameters of the wire.

~~Wires with a cross-section above $2.5mm^2$ are to be~~ tested screened, rolled in bundles with a diameter ofnot less than 20 diameters of the wire. Before the test, the samples are to be checked with an AC voltage of 1500V of a feequency of 50Hz for 1 minute.

The samples are to be placed in a pressure chamber with a set pressure of $6.7 \cdot 10^2$ Pa (5 mm Hg) and are to be held there for 48 hours. After that the samples without being taken out from the chamber, are to be tested with AC voltage of 500V of a frequency of 50Hz for 1 minute.

T. 2051

3.6.6 Resistance of wires to increased atmospheric pressure (item 1.7.6) is to be checked on samples of not less than 1.5M long as per method 201-1 GOST 16962-71.

The samples for the test are to be prepared in accordance with item 3.6.5.

The samples are to be placed in a pressure chamber, with ~~out~~ set pressure of 3 atmospheres and are to be held there for 20 minutes.

The samples are to be tested with an Ac voltage of 1500V of a frequency of 50Hz for 1 minute in accordance with GOST 2990-72 ~~the chamber~~ before the test and after having been taken out frin the chamber.

3.6.7 Resistance of a varnish film to the effect of oil and benzine mixture (item 1.7.7) is to be checked by immersing samples of a length of 0.5kg in mixture of equal volumes of petroleum motor oil (AK-10 or AK-18 GOST 1862-63) and benzine (aviation or rubber solvent GOST 443-56) for 6 hours at a temperature from 15^{o} to 25^{o}c.

While immersing the samples into the mixture their ends of about 50mm long should be brought out side. The samples, taken out from the bath, should be rubbed dry with a rag and immediately weighed. Wire mass increase should not exceed 20%.

Percentage of mass increase should be calculated as per the following formula:

$$P = \frac{P_2 - P_1}{P_H} \times 100$$

I 2057

where P-the mass increase in per cent

P1-the mass of the wire before immersing in the mixture, g.

P2-the mass of the wire after immersion in the mixture, g.

PH-the calculated mass of the immersed part of the wire minus the calculated mass of the same part of the current carrying core, g(during arbitration tests PH is to be determined by weighing).

3.6.8 Combustibility (item 1.7.8) is to be tested on sample of 220mm long, arranged horizontally. Fire is to be set on with alcohol lamp flame approximately in the middle of the sample. As soon as the wiere catches fire the alcohol lamp flame should be quickly putout. The flame the wire should extinguihs or ppppagate w ith a speed of not more than 50mm per 30 seconds. The test is to be carried out without air movement.

3.7 Checking for the conformity with requirements for reliability.

3.7.1 *) Testings for confirmation of operating time of wires is to be carried out as per methods, in accordance with OST "Electrical technical articles" cables and wires. Reliability, freedom from failure durability keeping quality. General requirements and testings methods.*)See the introduction book/record.

3.7.2 To prove quality keeping terms (item 1.9.3) wires should be put to storage in store houses and an actual storage term is to be determined as per periodic checkings. (Once every 3 years) as per items 1.4.3, 1.4.4. Periodic checkings are to be carried out on samples of not less than 1.5M long, taken out from

I. 2051

~~xxxxxxxxxxxxxxxxxx~~
the wire bundles being stored.

3.8 Checking of marking packing.

3.8.1 Conformity of wires with requirements for marking (items 1.10.1,1.10.2) and packing (item 1.11.1) should be visually checked.

4. TRANSPORTATION AND STORAGE:

4.1 Wires are to be transported in accordance with GOST 18690-73.

4.2 Wires should be stored in accordance with GOST 18690-73 and GOST B9.007-72.

In seperate cases, wires may be stored at a positive temperature below 5°c (provided there is no possibility for moisture condensation and freezing on a wire surface) as well as in field condition with a relative air humidity of upto 98% at a temperature of 40°c.

5. INSTURCTION FOR OPERATIONS:

5.1 Wires may be mounted at a temperature of not less than 30°c *) See the introduction record.

5.2 Unscrewed wires may be used on exposure to salty fog when unprotected ends of a core are sealed.

5.3 Wires& БПВЛ and БПВЛЭ depending on the conditions of application should correspond to II and IV of ~~application groups.~~ groups of application

REMARK: Wires, which are run in capital unheated rooms, belong to group II; wires which are run fixed on mobile units as well as those run fixed outdoor and and protected from direct effect of solar radiation and atmospheric precipitations, belong to group III.

6. ~~XXXXXXXXXX~~
SUPPLIER'S GUARANTEE:

6.1 The manufacturing plant guarantees conformity of wires with the requirements of technical specifi cations for the whole service life (item 1 .9.2) or the quality keeping term (item 1.9.3) provided the concumer observes the operation, storage and transportation rules as well as instructions on application amd mounting stated in technical specifications.

Guarantee period is calculated from the moment of wires acceptance by TID of the manufacturing plant or by the consumer's representative.

I. 2051

Appendix

LIST OF DOCUMENTS WHICH ARE REFERRED TO IN the present TECHNICAL SPECIFICATIONS:

Document Number	Document discription
GOST 443-56	Benzine solvent for rubber industry. Technical Specifications.
GOST 860-60	Tin
GOST 1170-72	Mannual sewing needle
GOST 1862-63	Motor oils. Technical requirements.
GOST 1956-70	Current carrying copper round cores of cable articles with rubber or plastic insulation.
GOST 2990-72	Cables, wires, cords. Methods of voltage tests.
GOST 3345-67	Cables, wires, cords Methods of determination of electrical resistance of insulation
GOST 5960-72	Flexible PVC for protecting sheaths of wires and cables.
GOST 6132-71	Electric technical round aluminium wire conductor.
GOST 7229-67	Cables, wires and cords method of determination of electrical resistance of current carrying core.
GOST 8190-56	Silver solder.
GOST 12137-66	Current carrying aluminium round cores for cables amd wires with rubber and plastic insulation
GOST 12177-72	Cables, wires, and cords . Methods of a checking of design dimensions.
GOST 16962-71	Electronics and electrical engineering articles. Mechanical and climatic effects Requirements and testing methods.

Document number	Document description
GOST 17397-72	Cables, wires and cords. Methods of testing insulation cables cores, wires and cords for passage of AC voltage.
~~GOST 1 8690-73~~ GOSTB 18370-73 GOST 18690-73	Cables, wires, cords and cable reinforcement Packing marking transportation a nd storage.
GOST B 9.003-72 005.058	
MPTY 6-06-214-69	Coloured capron thread
MPTY 6-05-D033-66	Polyamide varnish No.548
OCT 6-06-CI-75	Capron thread for fish industry.
Ty6-10-691-74	Ethyl cellulose lacquer 9U 959
T Ty6-10-1362-73	Varnish HU 995A
Ty6-11-200-71	Glass, twisted, complex threads.
Ty16-505-850-75	Copper tinned round wire conductor for electrotechnical pruposes.
Ty 17PCØCP4452.75	Collon twisted antiseptic yarn for cable industry.

TY-16-505-911-76

(156)

No:85055/OFPM/DS/86-87

Notification No.38

Date: 19.3.87.

NOTIFICATION OF AMENDMENTS TO SPECIFICATIONS

The following Corrections/Amendments are now required to be carried out in the documents as below:

Documents Details: TY16-505-911-76

OFPM Regn.No. : 1 2051

Details of Amendments:-

Sl.No. Details

1. Ref : page 2 of 31
   Delete : 'Superseeds'
   Add : "SUPERSEDES"
2. Ref : page 3 of 31, 2nd para, 2nd line
   Delete : 'Prupose'
   Add : "PURPOSE"
3. Ref : page 3 of 31, 3rd para, 3rd line
   Delete : 'appnedix'
   Add : "APPENDIX"
4. Ref : page 3 of 31, 5th para, last line
   Delete : б П В Л 0.35
   Add : бП В Л-0-0.35
5. Ref : page 4 of 31, 3rd para, 3rd line
   Delete : 'Carbon'
   Add : "CAPRON"
6. Ref : page 4 of 31
   Delete : бИВ Л М Э
   Add : бП В Л М Э
7. Ref : page 5 of 31, Table 1, column wire maximum external diameter, mm, б П В Л А, against 50.0
   Delete : 1.23

TY-16-505-911-76

Sl.No- Details

8. Ref : page 6 of 31, Table 2, 2nd column
Delete: 'diametet'
Add : "DIAMETER"

9. Ref : page 6 of 31, under Note.3
"Strand " is to be added after wire to read as
WIRE STRANDS

10. Ref : page 7 ~~of~~ of 31, item 1.2.3, 1st para
"GF" is to be inserted in between wire and atleast
to read as wires of atleast - - -

11. Ref : page 7 of 31, item 1.3.1; 3rd para, 1st line
"WIRE" is to be added after seperate to read as
SEPERATE WIRE CONDUCTORS

12. Ref : page 8 of 31, 2nd para
Delete: 'wleding'
Add : "WELDING"

13. Ref : page 8 of 31, item 1.3.3, 3rd para, 4th line
Delete: compacness
Add : "COMPATNESS"

14. Ref : page 8 of 31, item 1.3.3, 5th para, 2nd line
Delete: 'CONTAMINATORS'
Add : "CONTAMINATIONS"

15. Ref : page 10 of 31, item 1.3.8
Delete: Sire
Add : "WIRE"

16. Ref : page 10 of 31, item 1.3.8, 2nd line
"G" is to be added in front of OST to read as
GOST 6132-71.

17. Ref : page 11 of 31, item 1.4.1, 3rd line
Delete: 'shwon'
Add : "SHOWN"

Contd.

TY-16-505-911-76

Sl. No.	Details
18.	Ref : page 11 of 31, item 1.4.3, 2nd line
	Delete : 500 V
	Add : 1500 V
19.	page 11 of 31, item 1.5.1, 6
	Delete : mc
	Add : ms
20.	Ref : page 12 of 31, item 1.7.5
	Delete : 6.710^2
	Add : $6,7.10^3$
21.	Ref : page 12 of 31, item 1.7.8, 3rd line
	Delete : 55mm
	Add : 50mm
22.	Ref : page 13 of 31, item 1.8.1, 2nd para, 2nd line
	Delete : "CORSS"
	Add : "CROSS" to read as CROSS-SECTION
23.	Ref : page 13 of 31, item 1.8.2, 3rd line "IN" is to be inserted in between content and air to read as THEIR CONTENT IN AIR - - -
24.	Ref : page 13 of 31, item 1.9
	Delete : "relaibility"
	Add : "RELIABILITY"
25.	Ref : page 13 of 31, iten 1.9.1 under REMARKS, 1st para, 3rd line
	Delete : 'alue'
	Add : "VALUE"
26.	Ref : page 13 of 31, same item as above, 2nd para, 1st line "[illegible]" is to be inserted before [illegible]
27.	Ref : page 15 of 31, item 2.1.1, 2nd line
	Delete : "Qulity"
	Add : "QUALITY"

Contd.4/

TY-16-505-911-76

Sl.No. Details

28. Ref : page 16 of 31, & 1st para, 3rd line
Delete : 'US'
Add : "IS"

29. Ref : page 16 of 31, Table 3, under "Minimum sampling from a batch to be submitted ", against pt.4
Delete : 'byt'
Add : "BUT"

30. Ref : page 17 of 31, item 2.2.Ð, 4th para, 4th line
Delete : 'samling'
Add : "SAMPLING"

31. Ref : page 17of 31, Table 4, description of checkings and tests 1st test group, 1st pt.
The following are to be added after wires БПВЛ, БПВЛА, БПВЛМ to read as " VOLTAGE TESTING OF WIRES БПВЛ, БПВЛА, БПВЛМ - - -

32. Ref : page 18 of 31, Table 4, 5th test group
"БПВЛМ" is to be added after wires

33. Ref : page 18 of 31, 1st para after the Table
Delete : 'ruing'
Add : "DURING"

34. Ref : page 18 of 31, 3rd para after the Table
Delete : 'cuases'
Add : "CAUSES"

35. Ref : page 18 of 31, 2nd para after the Table
Delete : 'preresentative'
Add : "REPRESENTATIVE"

36. Ref : page 19 of 31, item 3.2.2, 3rd line
Delete : 'checkee vieually'
Add : "CHECKED VISUALLY"

Contd/-5

 TY-16-505.911-76

Sl.No. Details

37. Ref : page 20 of 31, item 3.3.3, 5th line
"m" is to be inserted after 1.5 to read as 1.5m

38. Ref : page 20 of 31, item 3.4.1, 2nd para, 2nd line
Delete : 'mchine'
Add : "machine"

39. Ref : page 20 of 31, item 3.4.1, 2nd para, 4th line
Delete : 1000 Hz
Add : 2000 Hz

40. Ref : page 21 of 31, item 3.4.2, 3rd line
"h" is to be inserted inbetween 't' and 'o'
of mthod to read as METHOD

41. Ref : page 21 of 31, item 3.4.3, 1st para, 3rd line
Delete : 'accodanc'
Add : "ACCORDANCE"

42. Ref : page 21 of 31, item 3.4.3, 2nd para, 6th line
Delete : hour
Add : "MIN"

43. Ref : page 22 of 31, item 3.5.1, 2nd para, 2nd line
Delete : "SWEING"
Add : "SEWING"

44. Ref : page 22 of 31, item 3.5.1, 4th para, 2nd line
Delete : "end"
Add : "AND"

45. Ref : page 22 of 31, item 3.6, 2nd line
Delete : 'clamatic'
Add : "CLIMATIC"

46. Ref : page 23 of 31, item 3.6.1, last para
Delete : 'necked'
Add : "NAKED"

Contd.6/-

TY-16-505-91176

Sl.No. Details

47. Ref : page 23 of 31, item 3.6.2, 2nd para, 3rd line
"MINUS" is to be added before 60 ± 2°C

48. Ref : page 24 of 31, item 3.6.4, 2nd line
Delete : 207-1
Add : 207-2

48.a. Ref : page 24 of 31, item 3.6.4, 9th line
Delete: 'screend'
Add : "SCREENED"

49. Ref : page 26 of 31, item 3.6.6, 3rd line
Delete : 201-1
Add : 210-1

50. Ref : page 26 of 31, item 3.6.6, 4th para, 5th line
Delete : 'frin'
Add : "FROM"

51. Ref : page 26 of 31, item 3.6.7, 3rd line
Delete : 0.5kg
Add : 0.5m

a. Ref : page 26 of 31, item 3.6.7, 5th line
Delete : GOST 1362-63
Add : GOST 1862-63

52. Ref : page 27 of 31, item 3.6.8, 4th line
Delete : 'wiere'
Add : "WIRE"

53. Ref : page 27 of 31, item 3.6.8, 6th line
Delete : 'extinguihs'
Add : "EXTINGUISH"

54. Ref : page 28 of 31, item 5.2, 1st line
Delete : 'unscrewed'
Add : "UNSCREENED"

55. Ref : page 29 of 31, item 6.1, 5th line
Delete : 'concumer'
Add : "CONSUMER"

Contd.7/-

TY-16-505-911-76

Sl.No. Details

56. Ref : page 29 of 31, item 6.1, 5th line "Condition" is to be added after operation to read as operation condition

57. Ref : page 31 of 31, TY 17PC/CP4452.75
Delete: 'collon'
Add : "COTTON"

AWM/DS

To

AF/P.D.O

Copy to: CI/ICV.