

Self supporting insulated wires (Aerial Bundled Conductor) SIP per GOST R 52373-2005 and TU 16-705.500-2006
(TU 16-705.500-2006 used instead of TU 16.K71-268-98 and TU 16.K71- 272-98)

Self-supporting Wire Description

SIP is a self-supporting insulated wire which is intended to transfer electrical energy in overhead power lines and branch off from trunk lines to enter into residential buildings and utility buildings. The laying is carried out on supports, as well as on the walls and structural elements of industrial and residential buildings.

AsXS is a self-supporting wire for overhead power lines with aluminum conductors, insulated with XLPE, resistant to ultraviolet.

AsXS_n is a self-supporting wire with aluminum conductors, insulated with XLPE, resistant to ultraviolet, flame retardant.

The wires are designed for the transmission and distribution of electrical energy in power and lighting networks for an alternating voltage 0.6/1 kV.

The insulated wires with a neutral self-supporting conductor (SIP-1 and SIP-2) are intended for installation and reconstruction of overhead power transmission lines and linear branches from overhead lines, as well as descents to power electrical equipment.

The insulated wires without a neutral self-supporting conductor (SIP-4, SIP-5 and AsXS, AsXS_n) are intended for the branches from overhead power lines to the enter, and for the laying along the walls of buildings and structures.

INTERPRETATION OF WIRES SIP-1, SIPN-1, SIP-2, SIPN-2, SIP-4, SIPN-4, SIP-5, SIP-5NG, ASXS, ASXSN

S – self-supporting;

I – insulated;

P – wire;

n, ng – does not support combustion.

A – aluminum conductor;

s – self-supporting wire;

XS – insulation made of cross-linked polyethylene;

n – does not support combustion.

Self-supporting Insulated (SIP) Cables Application

SIP-1 - for overhead transmission lines (TL) and linear TL deviations in atmosphere types I and II as per GOST 15150-69

SIP-2 - for overhead transmission lines (TL) and linear TL deviations in atmosphere types I and II as per GOST 15150-69 , including sea coasts, salt lakes shores, in industrial areas and halopsammophilous areas

SIP-3 - for TL with nominal voltage 10-35 kV in atmosphere types II and III as per GOST 15150-69 , including sea coasts, salt lakes shores, in industrial areas and halopsammophilous areas

SIP-4 - for TL deviations to entry and for laying in walls of buildings and engineering structures in atmosphere types II and III as per GOST 15150-69

Self-supporting Insulated (SIP) Cables Construction

The number in the wire marking indicates the type of construction.

SIP-1 – with a non-insulated neutral self-supporting conductor;

SIP-2 – with an insulated neutral self-supporting conductor;



SIP-4 – without neutral self-supporting conductor with light-stabilized polyethylene insulation;

SIP-5 – without neutral self-supporting conductor, insulated with silanol-crosslinked light-stabilized polyethylene.



1. CONDUCTING CORE – Al, round core, for all cross-section the core is compacted multiwire, the quantity of wire in phase core. Outer diameter of conducting core and its electrical resistance shown in bellow table:

Nominal cross-section of phase core, mm ²	Number of wires in the core, units.	Outer diameter of conducting core, mm	
		Min.	Max.
16	7	4,6	5,1
25	7	5,7	6,1
35	7	6,7	7,1
50	7	7,85	8,35
70	7	9,45	9,95
95	7	11,1	11,7
120	19	11,1	13,1
150	19	14,0	14,5
185	19	15,45	16,15
240	19	17,75	18,45

2. NEUTRAL MESSAGING CORE – form Al alloy, round core, stranded from round wires, compacted. Nominal cross-sections, number of wires in the core, outer diameter of core, its burst capacity and electrical resistance are specified in the bellow table:

Nominal cross-section of phase core, mm ²	Number of wires in the core, units.	Outer diameter of conducting core, mm	
		Min.	Max.
25	7	5,7	6,1
35	7	6,7	7,1
50	7	7,85	8,35
54,6	7	9,2	9,6
70	7	9,45	9,95
95	7	11,1	11,7
120	19	12,2	12,9
150	19	13,9	14,5
185	19	15,75	16,15
240	19	17,75	18,45

3. INSULATION – in SIP-1 the neutral core is not insulated. In other conductors the insulation made from light-stabilized cross-linked PE. Insulated phase cores have the distinctive coloring. Insulation thickness is shown in the following table:

Types of wire	Nominal insulation thickness, mm						
	16	25	35	50	54,6	70	95
SIP-1							
SIP-2	1,3	1,3	1,3	1,5	1,5	1,7	1,7
SIP-3 20 kV	2,3						
SIP-3 35 kV	3,5						
SIP-4	1,3	1,3					

4. STRANDING – insulated phase cores are stranded round a bearing neutral core. Stranding direction is right-hand. On the customer's request it is permissible to manufacture SIP-1 and SIP-2 with auxiliary insulated lead with cross-section 16 and 25 mm² for lighting circuit connection.

TECHNICAL SPECIFICATION

Type of climatization is UHL, allocation category are 1, 2 and 3 as per GOST 15150-69.

Conductors are resistant to solar radiation characterized by warmth fluence $1120 \text{ W/m}^2 \pm 10\%$, including density of ultraviolet part of spectrum $68 \text{ W/m}^2 \pm 25\%$.

Conductors are resistant to bending at the temperature.....-40°C

Cabling and installation should be carried out at ambient temperature not less than-20°C

Permissible forces in a neutral supporting conductor at tension and while exploiting are not greater than.....45 N/mm²

Insulated cores of wires should withstand the test by AC voltage 3.5 kV and frequency 50 Hz in passing

After standing in the water at the temperature 20°C not less 10 min the conductors should withstand

AC voltage test 50 Hz during 5 minutes with the following values:

For SIP-1, SIP-2 and SIP-4 conductors.....4 kV

For SIP-3 conductors for 20 kV.....6 kV

For SIP-3 conductors for 35 kV.....10 kV

Conductors withstand the test by AC voltage 4 kV frequency 50 Hz during 1 hour.

Permissible conducting cores heating temperature is not more than +90°C in normal conditions and 250°C at short-circuit.

Allowable conductor current load estimated at the ambient temperature +25°C, wind speed 0.6 m/s and solar radiation intensity 1000 W/m².

Permissible one-second short-circuit currents:

Nominal cross-section of main cores, mm	Permissible current load, A, not more			Permissible one-second short-circuit current, kA, not more	
	of self supporting insulated wire	of protected wire		of self supporting insulated wire	of protected wire
		25kV	35kV		
16	100	-	-	1,5	-
25	130	-	-	2,3	-
35	160	200	220	3,2	3,0
50	195	245	270	4,6	4,3
70	240	310	340	6,5	6,0
95	300	370	400	8,8	8,2
120	340	430	460	10,9	10,3
150	380	485	520	13,2	12,9
185	436	560	600	16,5	15,9
240	515	600	670	22,0	20,6

SIP-1 SIP-2 SIP-3 SIP-4 Aluminum Cable Specifications

Mark and rated voltage wire	Number and nominal cross-phase and zero bearing veins sht.h mm ²	Estimate the outer diameter of wire, mm	Estimated weight of 1 km of wire, kg
SIP-1 0,6 / 1 kV	1x16+1x25	15	135
	3x16+1x25	22	270
	3x25+1x35	26	390
	3x35+1x50	30	530
	3x50+1x50	32	685
	3x50+1x70	35	740
	3x70+1x70	37	930
	3x70+1x95	41	990
	3x95+1x70	41	1190
	3x95+1x95	43	1255

	3x120+1x95	46	1480
	3x150+1x95	48	1715
	3x185+1x95	52	2330
	3x240+1x95	56	2895
SIP-2 0,6 / 1 kV	3x16+1x25	24	308
	3x16+1x54,6*	28	427
	3x25+1x35	27	424
	3x25+1x54,6*	30	512
	3x35+1x50	31	571
	3x35+1x54,6*	32	606
	3x50+1x50	34	727
	3x50+1x54,5*	35	762
	3x50+1x70	36	798
	3x70+1x54,6*	39	973
	3x70+1x70	40	1010
	3x70+1x95	41	1087
	3x95+1x70	43	1240
	3x95+1x95	45	1319
	3x120+1x95	48	1553
	3x150+1x95	50	1787
	3x185+1x95	55	2403
	3x240+1x95	60	2968
SIP-3 20 kV	1x35	12	165
	1x50	13	215
	1x70	15	282
	1x95	16	364
	1x120	18	445
	1x150	19	540
	1x185	24	722
	1x240	24	950
SIP-3 20 kV	1x35	14	209
	1x50	16	263
	1x70	17	334
	1x95	19	421
	1x120	20	518
	1x150	22	618
	1x185	24	808
	1x240	26	1045
SIP-4 0,6/1 kV	2x16	15	139
	4x16	18	278
	2x25	17	196
	4x25	21	392

SIP-1, SIPn-1 Parameter

Number of conductors and nominal cross-section, mm ²	Nominal outer diameter, mm	Weight of 1 km of wire, kg
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1 x 16 + 1 x 25	13,4	136
3 x 16 + 1 x 25	17,8	274
3 x 25 + 1 x 35	20,8	392
3 x 35 + 1 x 50	23,4	517
3 x 50 + 1 x 50	26,0	654
3 x 50 + 1 x 70	27,1	710
3 x 70 + 1 x 70	30,8	931
3 x 70 + 1 x 95	32,1	1002
3 x 95 + 1 x 70	33,7	1174
3 x 95 + 1 x 95	34,9	1246
3 x 120 + 1 x 95	38,2	1470
3 x 150 + 1 x 95	40,5	1697
3 x 185 + 1 x 95	45,0	2065
3 x 240 + 1 x 95	50,1	2521

SIP-2, SIPn-2 Parameter

Number of conductors and nominal cross-section, mm ²	Nominal outer diameter, mm	Weight of 1 km of wire, kg
3 x 16 + 1 x 25	20,6	306
3 x 25 + 1 x 35	21,8	428
3 x 25 + 1 x 54,6	23,2	489
3 x 35 + 1 x 50	24,6	566
3 x 35 + 1 x 54,6	25,0	581
3 x 50 + 1 x 50	27,1	703
3 x 50 + 1 x 54,6	27,7	718
3 x 50 + 1 x 70	28,6	777
3 x 70 + 1 x 54,6	32,1	939
3 x 70 + 1 x 70	32,1	997
3 x 70 + 1 x 95	33,5	1078
3 x 95 + 1 x 70	36,4	1241
3 x 95 + 1 x 95	36,4	1322
3 x 120 + 1 x 95	39,8	1546
3 x 150 + 1 x 95	43,8	1773
3 x 185 + 1 x 95	46,7	2141
3 x 240 + 1 x 95	50,1	2598

SIP-4, SIPn-4, SIP-5, SIP-5ng, AsXS, AsXS_n Parameter

Number of conductors and nominal cross-section, mm ²	Nominal outer diameter, mm	Weight of 1 km of wire, kg
1 x 10	6,2	47
1 x 16	7,4	68
1 x 25	8,6	98
1 x 35	9,7	129
1 x 50	11,3	174
1 x 70	13,3	246
1 x 95	15,1	327
1 x 120	16,5	401
1 x 150	18,2	475

1 x 185	20,2	596
1 x 240	22,5	747
2 x 10	12,4	94
2 x 16	14,8	138
2 x 25	17,2	199
2 x 35	19,4	260
2 x 50	22,5	351
2 x 70	26,6	499
2 x 95	30,2	661
2 x 120	33,1	811
2 x 150	36,3	962
2 x 185	40,4	1207
2 x 240	44,9	1512
3 x 10	13,4	142
3 x 16	15,9	207
3 x 25	18,5	298
3 x 35	20,8	391
3 x 50	24,2	527
3 x 70	28,6	748
3 x 95	32,4	991
3 x 120	35,5	1216
3 x 150	39,0	1443
3 x 185	43,4	1811
3 x 240	48,3	2267
4 x 10	15,0	189
4 x 16	17,8	276
4 x 25	20,8	397
4 x 35	23,4	521
4 x 50	27,1	703
4 x 70	32,1	997
4 x 95	36,4	1322
4 x 120	39,8	1621
4 x 150	43,8	1924
4 x 185	48,7	2415
4 x 240	54,2	3023