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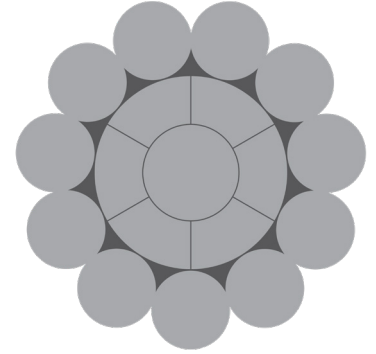
SOUTHWIRE SIW STRANDING FOR 600V OVERHEAD AND UNDERGROUND SECONDARY CABLES



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HISTORY:

Southwire company and the utility industry has converted its stranding techniques from reverse concentric and unilay compressed to compressed single input wire (SIW) for 600V underground and overhead distribution conductor sizes up to 1000 kcmil over a decade ago. SIW stranding enables cable manufactures to carry less in-process inventory due to universal wire size and therefore simplify production planning and reduce lead time.



SPECIFICATIONS:

SIW conductors are manufactured at Southwire's plant in Carrollton, Georgia per ASTM B901. The standard does not specify the strand count for each conductor size, but rather, it states a minimum number of strands for each size. SIW stranding does not change the metal area or weight or impact the DC resistance value. SIW conductor has an identical outside diameter compared to its unilay compressed counterpart. Additionally, SIW stranding is allowed by several industrial standards, including but not limited to the following:

- **ANSI/ICEA S-76-474** (Neutral-supported power cable assemblies rated 600V)
- **ANSI/ICEA S-105-692** (600V single layer thermoset insulated utility underground distribution cables)
- **ANSI/ICEA S-81-570** (600V cable of ruggedized design for direct burial installations)

CONNECTIVITY TESTING:

Our connector testing has validated that both 1/0 and 4/0 SIW conductors meet the electrical and mechanical requirements per ANSI C119.4. SIW conductors can be installed with the same connector type either mechanical (bolt-on) or compression. We can also confirmed that all the connectors used on conductors made per ASTM B231 also work on the ones made per ASTM B901.

Aluminum Conductor Size		Reverse Concentric Compressed Class B ASTM B231		Unilay Compressed Class B ASTM B231		SIW Compressed ASTM B901			DC Resistance at 20° C	
cmils	AWG	No. of Wires	Diameter Inches	No. of Wires	Diameter Inches	Min. No. of Wires	Typical No. of Wires	Diameter Inches	All Constructions	
									Ω/1000 ft	Ω/km
1,000,000	–	61	1.117	61	1.084	53	59	1.084	0.0173	0.0568
750,000	–	61	0.968	61	0.939	53	60	0.939	0.0231	0.0758
500,000	–	37	0.789	37	0.766	30	39	0.766	0.0347	0.114
350,000	–	37	0.661	37	0.641	24	31	0.641	0.0495	0.162
250,000	–	19	0.558	37	0.542	18	22	0.542	0.0694	0.228
211,600	4/0	19	0.512	19	0.498	17	18	0.498	0.0820	0.269
167,800	3/0	19	0.456	19	0.443	15	17	0.443	0.103	0.338
133,100	2/0	19	0.405	19	0.395	11	11	0.395	0.130	0.427
105,600	1/0	19	0.362	19	0.352	7	9	0.352	0.164	0.538
83,690	1	19	0.322	19	0.313	7	9	0.313	0.207	0.679
66,360	2	7	0.283	–	–	6	7	0.283	0.261	0.856



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ASTM	B231	B901
Info	Concentric-Lay-Stranded Aluminum 1350 Conductors	Compressed Round Stranded Aluminum Conductors Using Single Input Wire (SIW) Construction
Class	Applies to conductors used in bare and covered constructions. Uses "Class" designations to differentiate usage and lay direction.	Applies to conductors intended for subsequent insulation or covering. Classification is SIW compressed. No further "Classes" are defined. All are left hand lay.
Temper	H19 hard drawn, and intermediate tempers.	The same, except B901 also allows B800 aluminum alloy of 8000 series where required.
Joints	Electric butt welds, cold-pressure welds, or electric-butt, cold upset joints weld may be made in the finished wires. The minimum distance between joints in the wires of the complete conductors shall be no less than 1 ft (0.3 m).	Cold-pressure joints, or electric-butt, cold upset joints maybe made in the wires of SIW conductors (The same except electric butt welds are deleted).
Lay Length	Requires lay length of 8 to 16 times the diameter of the layer, applicable to only the two outer layers of conductors of 37 wires or more.	The same
Lay Direction	In products to be covered or insulated it allows unilay or unidirectional stranding. Left hand lay is required.	The same
Diameter & Tolerance	Specifies diameters for unilay compressed. Allows +1% and -2% tolerance.	The same
Density	Specifies aluminum 1350 density at 2705 kg/m ³ (0.0975 lb/in ³) at 20°C.	The same
Area & Tolerance	Requires no less than 98% if nominal area, with electrical resistance as the definitive requirement for covered or insulated conductors.	The same
Mass	Specifies a procedure for calculating mass	The same
Electrical Resistance	Specifies a procedure for calculating mass and is a function of the lay length. The maximum electrical resistance of a unit length of a stranded conductor shall not exceed 2% over the nominal DC resistance shown in the Table.	The same
Rated Strength	Defines a calculation method using the min and max tensile strengths of the individual wires, and the nominal wire area, derated by the number of layers.	The same procedure. However, rated strengths on some size may slightly differ due to different rating factors (%) per Table 2 from B901.
Mechanical and Electrical Tests	Provides requirements for testing of wires and completed cables annealed after stranding, and before stranding.	The same except with the addition of requirements for 8000 series aluminum.
Packaging & Marking	Provides guidance for packaging and marking of cable to be further processed, as well as cable to be sold in the bare form.	The same except the bare products for overhead use are not included in this standard.

