

Wire and Cable Terms/Rating Wire and Cable Terms/Rating Wire and Cable Terms/Rating

by Technical Support
BARE CONDUCTOR

A. BASE METALS

1. COPPER - The copper used in all Southwire products is described in ASTM Specifications as UNS No. C11000, Electrolytic Tough Pitch (ETP). Bare copper is produced in three tempers: Hard, Medium-Hard, and Soft. Copper utility covered and insulated products can be manufactured in all three tempers. Insulated copper building wire and cable is manufactured in soft temper only.

2. ALUMINUM - In most utility products, the aluminum content is either commercially pure aluminum (Aluminum Association designation 1350) or aluminum alloy - Aluminum Association designation 6201. In building wire and cable products, the aluminum content is required by National Electrical Code and UL Standards to be an AA-8000 series aluminum alloy of electrical conductor grade. These alloys are specifically designed for building wire with improved characteristics related to flexibility, strength, and termination performance. Southwire's trade name for our AA-8000 alloy is TRIPLE E and the Aluminum Association has assigned us the alloy No. 8176.

B. STRANDING CONSTRUCTIONS

1. CONCENTRIC - A central core wire surrounded by one or more layers of helically applied wires.

2. COMPRESSED - A concentric stranded conductor where each layer is passed through a closing die to reduce the diameter of the stranded conductor by 3%. Southwire's registered trade name for compressed stranding is ARROWSTRAIGHT.

3. COMPACT - A concentric stranded conductor where each layer is passed through a closing die to reduce the diameter of the stranded conductor by approximately 10%.

C. CONDUCTOR MEASUREMENTS

1. AMERICAN WIRE GAGE (AWG) - The standard system used in the United States for designating the size of electrical conductors. AWG sizes range from No. 56 gage (0.00049 inch diameter) through 4/0 (0.460 inch diameter) for solid conductors.

2. CIRCULAR MIL (cmil) - By definition, the area of a circle whose diameter is one mil (one one-thousandth of an inch). Unit is so small that the prefix "k" is normally used in denoting wire sizes larger than those covered by the American Wire Gage system. For example, 250,000 circular mils is normally denoted 250 kcmil.

3. MIL - One one-thousandth of an inch (0.001 inch). Overall diameters of wire and cable are usually expressed in mils. To convert to inches, merely move the decimal point three places to the left or divide by 1000.

CONDUCTOR INSULATION / CABLE JACKETS

A. TERMS

1. INSULATION - The material surrounding an electrical conductor to insulate or isolate it from other conductors or grounded objects.

2. COVERING - Generally the same material as insulation but not applied with the thickness to qualify as insulation.

3. JACKET - As used on a single conductor or cable: A nonmetallic material applied over conductor insulation primarily to serve as physical protection for the insulation (also protects neutral wires on high-voltage cables). Note: Although most jackets do have some insulation qualities, they are not depended upon to act as insulation.

4. JACKET - As used on a multiconductor cable: A nonmetallic material applied over a cable assembly of two or more conductors to provide physical protection for the conductors, hold the assembly together, and to provide a one-piece construction for easier installation.

5. THERMOPLASTIC - Insulating materials that will melt at temperatures much higher than the material is rated. Polyvinyl chloride (PVC) and polyethylene (PE) are examples of thermoplastic insulations.

6. THERMOSET - Insulating materials that do not melt at higher temperatures. (Caution: thermoset materials will degrade at temperatures much higher than the material is rated.) Rubber and crosslinked polyethylene (XLPE) are examples of thermoset insulation. Southwire's trade name for XLPE is VIP (Vulcanized Interlinked Polyethylene).

RATINGS

A. AMPACITY

1. DEFINITION - The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating

B. VOLTAGE

1. Force required to produce current flow, commonly termed "electromotive force" (emf). Voltage necessarily must be stated as being a gradient between two points or

objects; eg, phase-to-ground signifies the voltage gradient between an ungrounded conductor and a grounded object.

C. FLAME

1. ALL WIRE & CABLE. All building wire & cable must be flame retardant as specified in the National Electrical Code. UL Standards contain flame tests to ensure the products comply with the NEC requirement. These tests are required for listing and labeling and no additional marking on the product is required.

2. VW-1 - Where a greater degree of flame retardancy is desired, over that required for all wire & cable, this Vertical Wire flame test can be imposed. This is an optional flame rating, and products meeting the test may carry the additional marking "VW-1." Southwire's THHN-THWN-2 in AWG sizes 14 through 1 have this additional flame rating.

3. VERTICAL TRAY - This is also an optional flame rating, and products meeting the test requirements are deemed suitable for installation in cable trays and may be marked "for CT use" or similar wording. The 1999 NEC will permit single conductor sizes 1/0 AWG and larger to be installed in cable trays. Southwire's THHN-THWN-2 has this rating on the sizes permitted by the NEC.

D. TEMPERATURE

1. The temperature rating of a conductor is a maximum temperature, at any location along its length, that the conductor can withstand over a prolonged period of time without serious degradation. For conventional building wire and cable the most common ratings are 60°, 75° and 90° centigrade. Appliance Wiring Material (AWM) is permitted to carry a 105°C rating only when it is used in appliances. "-2" rating denotes that cable is approved for operating temperature of 90°C in wet or dry locations.