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10 THINGS YOU MUST KNOW ABOUT SPEAKER CABLES

Southwire
CABLETECH SUPPORT™
Services

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1. WHY COPPER CONDUCTOR

Southwire sources a premium grade of copper cathode for casting, which yields the highest conductivity or the lowest electrical resistance. Upon thermal annealing, soft-drawn copper exhibits an electrical conductivity of 100% at 20°C per the International Annealed Copper Standard (IACS). The minimum copper percentage, or purity, is 99.9%, and the maximum impurity, or oxygen or trace element content, is 0.1%. Copper is selected for speaker cables instead of aluminum or other alloys because of its superior electrical, thermomechanical, physical, and chemical properties.

2. STRANDED CONDUCTOR DESIGN

Stranded wire offers two main benefits over solid copper wire, flexibility and larger surface area. Stranded wire is more flexible, allowing for easier installation around tight twists and bends and ease of installation into the speaker terminals. Stranded copper wire is also slightly larger than the same AWG-size solid conductor. This larger surface area is beneficial for applications involving high-frequency signals as it allows for better electrical current distribution, minimizing signal loss due to the skin effect.

3. IMPORTANCE OF AWG SIZE IN A SPEAKER ENVIRONMENT

AWG sizes are used on speaker cables to indicate the thickness of the wire, with a lower AWG number signifying a thicker wire, which translates to less electrical resistance and better signal transmission over longer distances and ultimately impacts the sound quality by minimizing signal loss when delivering power to your speakers; essentially, the right gauge ensures your speakers receive the full audio signal without significant degradation. The most common AWG sizes for speaker wire are 18 AWG, 16 AWG, 14 AWG, 12AWG, and 10 AWG. The best gauge for your speaker wire depends on the rated impedance of the system, cable run length, and the speakers' power requirements. A 16 AWG wire is often sufficient for short runs, while longer runs or high-power speakers may need a thicker 12 AWG wire.

4. THE ROLE OF THE CABLE INSULATION

The main function of the insulation in speaker wires is to protect the conductors. It prevents the conductors from encountering each other, which could cause short circuits and signal degradation. Insulation also safeguards the conductors from external factors, such as moisture and physical damage, that could degrade or interfere with the audio signal transmission. Southwire uses high-quality clear PVC on ZIP Speaker cables and low capacitance Polypropylene with PVC jacket in Soundsational® Speaker Cables. Pressure-extruded insulation is ideal for the protection and longevity of speaker cables. Insulation that is pressure extruded will fill in the valleys between the stranded conductor, completely covering the copper surface and creating an air-tight seal, further effectively protecting the conductor from oxidation. Additionally, a cable with tight bends leading into a terminal or connector will have a certain amount of back tension force that is applied to the wire. Insulation that is not pressure extruded will have a lower strip force and adhesion on the conductor, allowing for the possibility of shrink back on the insulation. This shrink back can expose the metal conductor by having the insulation covering slide back from the termination point. This exposed conductor can cause potential issues, such as allowing the metal to oxidize or the circuit to short out.

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5. SPEAKER CABLE TYPES

Southwire offers several types of speaker cables, such as General-Purpose, ZIP Speaker Standard and Professional, and Soundsational® General-Purpose and Direct Burial. The cable selection will depend on the application, where the speakers will be located, and the type of speakers. The typical applications for 18 AWG are car and home speakers, low voltage lighting, and lamp cords in the 10 Amps range. The 16 AWG is most used for longer speaker runs or moderate power subwoofers with short lengths and light-duty extension cords supporting 13 Amps. A 14 AWG is usually needed for long speaker runs, high-power subwoofers with short lengths, light fixtures, lamps, or lighting circuits with 15 Amps. The 12 AWG is required for long speaker runs and high-power, short-length subwoofers in the 20 Amps range; finally, the 10 AWG size is usually needed for very long speaker runs with high-power short-length subwoofers.

6. CONFIGURATION (NUMBER OF WIRES)

A 2-wire speaker cable is the industry standard, providing just positive and negative connections to a speaker, while a 4-wire speaker cable offers the ability to connect to a speaker with separate high and low-frequency inputs, allowing for "bi-wiring" which could improve sound quality, essentially, a 4-wire cable gives you more flexibility for advanced speaker setups like bi-amping or bi-wiring, while a 2-wire cable is simpler and sufficient for most basic speaker connections. Four-conductor wires are available in the marketplace; they are ideal for running a single cable between your amplifier or receiver and an in-wall volume control in another room. They are also suited for connecting stereo-input speakers to amplifiers. The two conductor cables run from the volume control to both speakers in that location.

7. CODE COMPLIANCE

The National Electrical Code® (NEC) regulates the installation of speaker wires and audio interconnect cables through Article 640. The wire must be UL-rated as CL2 or CL3 for running speaker wire along walls or ceilings as per NEC Article 725. The CL2 is typically used for in-wall speaker installations within residential settings, while CL3 can be used for direct burial outdoors or in situations requiring higher voltage. These ratings indicate the level of fire resistance and surge protection the wire provides. If the speaker wire is for outdoor use or will run through the ground, it must be rated for direct burial. It can also be installed in a PVC conduit to protect it from digging and other landscaping activities. All Southwire speaker wire products are listed as either UL or ETL.

8. LOW VOLTAGE ELECTRICAL CABLE CL2 VS CL3

The primary difference between CL2 and CL3 wires is their voltage rating. CL3 has a higher capacity, meaning it can handle a higher voltage (up to 300 volts) compared to CL2 (up to 150 volts); essentially, CL3 is considered a more robust option for situations requiring higher power or harsher environments, while CL2 is suitable for most standard residential speaker installations.

9. REELEX® AIR PACKAGING

Designed with precision, REELEX® AIR Packaging's smooth, rounded entry provides a seamless installation experience. This unique payout design reduces friction during pulls and optimizes the bend radius to prevent premature unraveling. It saves time and labor by reducing material usage, and there is no need for stands or brakes. Packaging is recyclable, easy to break down, and can produce less material waste.

10. KEY INSTALLATION POINTS

When installing speaker wires, key considerations include measuring the distance between your amplifier and speakers, choosing the appropriate cable size of wire based on the length of the run and rated impedance of the system, ensuring correct polarity (positive to positive, negative to negative), stripping the wire ends properly, using appropriate connectors like plugs for secure connections, routing the wires away from power cables to avoid interference, and securing the wires to prevent movement and damage; always follow speaker or sound system manufacturer's instructions for your specific speaker setup.

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