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# 10 THINGS YOU MUST KNOW ABOUT BUILDING WIRE PRODUCTS

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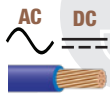
## 1. COPPER VS. ALUMINUM

Aluminum offers a significant cost reduction and a lighter weight (lb/1000 feet) at matching ampacity. Aluminum also exhibits better fatigue endurance, as it can be bent repeatedly without breaking. Aluminum building wires are designed with full compact stranding, which creates a smooth interface for the extruded insulation and minimizes compound "fall-in," which is most often seen on the largest feeder sizes. Pin adapters are not required, and the same termination procedure can be applied to both metal types using compression or mechanical lugs.



## 2. YES OR NO TO ANTIOXIDANT

Copper is more corrosion-resistant than aluminum. Therefore, it is more common to apply an antioxidant compound to the stranded aluminum conductor before making a connection. However, both copper and aluminum can form a thin layer of metal oxide which protects the underlying metal from further oxidation. Wire brushing and antioxidant treatment of the conductor before termination are not required but are considered best practices. Southwire recommends applying antioxidants to aluminum conductors for critical infrastructure projects such as data centers.



## 3. 600V VS. 1KV AND DC VS. AC

Keeping over-voltage under 10% of a conductor's rated voltage is considered best practice. For example, if over-voltage might exceed 660 volts for the 600V-rated SIMpull THHN/THWN-2® conductor, we recommend using a SIMpull XHHW-2® conductor, which is dual-rated for 600V/1000V. We are seeing a growing demand for SIMpull XHHW-2® conductors specifically for critical and heavily loaded circuits such as data centers or healthcare facilities. The maximum rated voltage of the cable remains the same whether installed on an AC or a DC circuit. The same cable can be deployed on AC-powered commercial buildings and DC-powered renewable applications such as Battery Energy Storage Systems (BESS).



## 4. TO BURY OR NOT TO BURY UF-B

Copper UF-B cable is a flat, jacketed, multi-conductor cable sized from 14 AWG to 6 AWG. For example, 12-3 CU UF-B WITH GROUND consists of four 12 AWG conductors, including three THHN phases in black, red, and white, plus a bare ground. It can be directly buried and can serve as a feeder to outside post lamps, pumps, and other loads fed from a distribution point in an existing building. UF-B cable may be used as interior branch circuit wiring in residential or agricultural buildings at conductor temperatures not exceeding 90°C with ampacity limited to that for a 60°C-rated conductor. The lead-free gray PVC jacket is marked with Southwire's unique E-FILE# E30445 signifying our UL 493 compliance.



### CABLETECHSUPPORT™ SERVICES

Southwire's CableTechSupport™ Services group features certified MV splicers, Professional Engineer (PE) certifications, Ph.D., MBA, and Master of Science degrees in electrical engineering. Over 15,000 technical requests with 100 signed letters are submitted yearly to gain approvals from engineers, inspectors, and Authorities Having Jurisdiction (AHJ). Our whitepapers and online tools help customers select



the most Reinforced, Resilient, and Reliable products. Scan the QR code to access our free technical library.



### BUILD AMERICA, BUY AMERICA

All of Southwire's building wire products listed on this whitepaper meet the Build America, Buy America (BABA) policy and comply with 49 U.S.C. § 5323(j) regulation. Raw materials from drawing, stranding, extrusion, and jacketing are made in the U.S.A. Cables are qualified to the most stringent industry standards, including ASTM and UL. The most frequently requested products showcased here are designed to power residential, commercial,



and government-funded infrastructure projects. Scan the QR code to access the spec library.





**5. DRY VS. DAMP LOCATION FOR NM-B**

Romex® Brand SIMpull® Indoor NM-B cables are rated for dry locations only. Many alternatives, including THHN/THWN-2 and XHHW-2, are suitable for damp or wet locations. Type NM-B cables contain a hygroscopic paper separator wrapped around the insulated conductors, allowing moisture to be trapped and migrate along the circuit. If NM-B cables are subject to natural disasters such as snowstorms, hurricanes, flooding, burst pipes, fires, or water sprinkler activations, cable replacement becomes inevitable because of the voided manufacturing warranty. If Romex® Brand SIMpull® Indoor NM-B cables are stored outdoors or exposed to sunlight and saltwater, Southwire also recommends replacing them due to the high risk from the wet environment.

**6. COMPATIBLE OR INCOMPATIBLE**

Not all chemicals serving the same purpose are composed of identical ingredients. Therefore, it is impossible to assess the impact, which is why codes and standards do not list comprehensive chemical compatibility testing. Consulting with the local inspector (or AHJ) for approval is necessary. We have not seen any severe impact from applying general-purpose cleaners, household paints, or common pest control sprays to building wire products. However, care must be taken if cable markings become illegible, which could be a safety hazard. We also recommend testing the chemical on a small cable section to confirm no dissolution or swelling occurs before applying it to a larger area.

**7. REDUCED VS. FULL NEUTRAL FOR MHF**

Aluminum Mobile Home Feeder (MHF) is an assembly of four conductors, each dual-rated as Type RHH/RHW-2 per UL 44 and USE-2 per UL 854. For example, 2-2-4-6 MHF contains two 2 AWG black phase conductors, one 4 AWG reduced neutral with three white stripes extruded over black insulation, and one 6 AWG green ground. 2-2-2-4 MHF is a premium version with a full-sized neutral that matches the phase conductor size plus a larger-sized ground. The conductor size and UL E-file E32071 are printed on all conductors for easier and more reliable connections. MHF can be directly buried in the ground and operated up to 90°C in wet or dry locations because of the USE-2 marking.

**8. SEU VS. SER**

UL 854 covers many types of service-entrance products. Type SE cables do not have an oil-resistance marking and are only certified for above-ground applications, unlike USE-2 designs, which are qualified for underground installs. Type SE Style R (SER) features a round cable assembly with bare grounding and insulated conductors cabled together. Type SE Style U (SEU) is designed with helically-applied bare concentric wires. Both products are finished with a gray flame-retardant PVC jacket that has passed the vertical flame testing per UL 1581. It is important to note that Southwire's SE cables are not marked for CT use or printed for sunlight resistance.

**9. REPAIR VS. REPLACE**

Southwire's Re<sup>3</sup>™ cable repair kit (SPEC 10911) can be applied to both single and multi-conductor products, including SIMpull THHN/THWN-2® conductors, SIMpull XHHW-2®/RW90 conductors, UF-B, Romex® Brand SIMpull® Type NM-B cable, SEU/SER, USE-2, and MHF. Damaged conductors (i.e., metal) or products exposed to significant weather events or incidents such as storms, fires, or floods are beyond repair. This all-in-one package includes an abrasive strip, a solvent wet wipe pack, one primary repair tape roll, one protective finishing tape roll, and an instruction sheet. With same-day shipment available, this cost-saving solution can restore new cables with minor scratches and small nicks to their original integrity and minimize scrap.

**10. FROM WET TO DRY**

Southwire has delivered emergency field support for over 20 years, including onsite nitrogen-purging services to mitigate unforeseen water intrusions in new cables. Moisture migration might occur during transit, storage, or installation due to unprotected ends or rainwater exposure during construction. The service life of a cable with trapped moisture will be shortened, and its performance will be compromised even if the cable is rated for wet locations or direct burial. Contact Southwire today to schedule a wet cable consultation or a purging service to remove water in new cables to prevent premature failures.