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The Most Advanced Weapon In The War To **Stop Copper Theft** 

# Copperweld® Copper-Clad Steel

- Magnetic
- Hard to cut
- · Low scrap value



# WELL-GROUNDED CONCERNS

A primary concern of electrical engineers is reducing the chance of hazards to personnel and valuable equipment caused by dangerous voltages and high potential gradients during fault conditions. Whether at electric utility

plants, telecommunications stations, military installations or in general industry, elimination of possible damage from lightning strikes or short-circuits is paramount. A reliable earthing system to dissipate the surge current to the earth is required.

Dead soft annealed (DSA) Copperweld wire and strand have been used for over 90 years as efficient, strong, non-rusting earthing conductors. Combining the strength of its steel core with the conductivity and corrosion resistance of its copper cladding, Copperweld earthing wire provides a long-lasting, low impedance path to earth. When annealed, Copperweld exhibits the



flexibility necessary for easy handling and is adaptable to standard installation techniques. DSA Copperweld® strand has become widely accepted as a more advantageous alternative to solid copper for earthing grids in substation and industrial installations.

Whatever the earthing application may be, there is a Copperweld® conductor available in the size, conductivity, and strength that is required. The selection of a particular size DSA Copperweld® wire or strand depends on many factors, such as short-circuit ampacity, area in contact with the earth, and temperature rise.

## SAFETY FIRST

The most important step in designing a substation, transmission or distribution grid is to implement a proper earthing system. Directing surges to earth prevents contact with dangerous voltage, and protects valuable equipment, maintenance personnel or any other individual who might come in contact.



DSA Copperweld \* wire and strand have the high current-carrying capacity characteristics in short-time durations, high strength properties and corrosion resistance to effectively and economically meet IEEE recommendations. These advantages are particularly evident when compared to a low-strength material such as solid copper. Solid copper conductors must be upsized in many installations to meet the mechanical demands within a system design.

Optimum earthing grid design depends on the dual complementing action of the conductor and the connected ground rods. An earthing system utilizing DSA Copperweld® strand provides efficient and economical earthing permanently.

# THE NATURAL CHOICE FOR ANY APPLICATION

#### **Substation Earthing**

In substation earthing, solid copper conductor's ability to handle the maximum fault current is compromised by its low breaking strength. As a result, it is not unusual to select a larger, more costly copper conductor that far exceeds the ampacity rating needed in order to meet the design criteria for minimum breaking strength. Rugged Copperweld® conductors, with their steel core, have a breaking strength exceeding IEEE criteria.

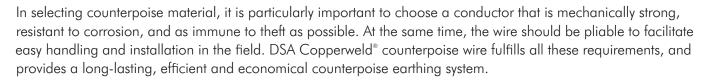
#### **Pole Earthing Wires**

DSA Copperweld \*\* conductors are ideal as down leads for transmission and distribution lines using wood, concrete or fiberglass poles. Their high strength, low impedance, resistance to fatigue and corrosion, and low theft potential combine to make CCS products superior for this application. Although mechanically strong, the pliability of DSA Copperweld\* permits the earthing wire to be easily formed from the connection overhead, along the pole and down to the buried electrode.

#### **Counterpoise Wire**

The resistance of the tower footing or structure earthing is dependent on local soil conditions and may vary widely over the length of a transmission line. Where underlying rock prevents the driving of earthing rods to the required depth, or where sandy or

rocky surface soils have high resistivity, counterpoise wires have proven very effective in improving the lightning protection afforded by the overhead earthing wires.

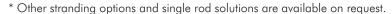


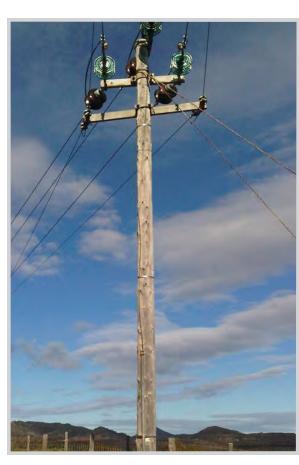
#### **Other Applications**

Copperweld® is an excellent choice for any earthing or fault-current application, including:

- Wind Farms
- Solar Installations
- Mobile Telephony Towers

#### DSA COPPERWELD® STRAND FOR EARTHING APPLICATIONS: PHYSICAL AND ELECTRICAL CHARACTERISTICS COPPER APPROXIMATE SHORT-TIME ACTUAL DIAMETER CONDUCTOR WEIGHT **FUSING CURRENT AT CROSS-SECTIONAREA** EQUIVALENCY 1 SECOND/60 CYCLES (mm) (kg/km) (mm 2) SIZE (kA) 19-Wire Strand 150 mm<sup>2</sup> EQ 47.70 20.57 252 66 2110 120 mm<sup>2</sup> EQ 200.47 37.85 18.33 1674 95 mm² EQ 16.32 158.97 1327 30.01 $70 \text{ mm}^2 \text{ EQ}$ 12 94 99 97 835 18.87 7-Wire Strand 50 mm<sup>2</sup> EQ 13.94 11.00 73.86 614 35 mm<sup>2</sup> EQ 9.36 10.10 53.49 445 16 mm<sup>2</sup> EQ 6.55 26.23 218 4.95





# THEY DON'T STEAL STEEL

The value of solid copper makes it so appealing for thieves, it might as well be gold. Copper can be sold for big money to scrap metal dealers who don't frequently inquire as to the source of what's being turned in. Solid copper is susceptible to theft at every stage of operations whether installed, in the back of a utility vehicle or in a storehouse. Pole earthing wire and exposed copper above ground level are particularly vulnerable. Once the wire is removed or damaged, the system risks unforseen fault current, potentially harming equipment and personnel, and causing outages for the general public.

Replacing stolen copper earthing material is a costly proposition for utility companies. Copperweld® conductors are theft-resistant, as the strong steel core of our wire is difficult to cut and remove, alerting thieves that our CCS is not a solid copper conductor. There is very little scrap value, so it's not a valuable target.



Our new product, Copperweld® CAMO™ represents the next step in theft protection. By altering the appearance of the external copper layer through our patent-pending process, thieves will mistake it for simple galvanized steel, and pass it by.

# BEATS COPPER IN THE GROUND

DSA Copperweld® wire and strand offers so many advantages over solid copper for earthing applications, it's the clear choice for all earthing applications.

- Conductivity of copper
- Strength of steel
- Fatigue resistance
- Corrosion resistance
- Ample fusing current
- Connects like copper
- Low scrap value

- ...For earthing applications
- ...Far superior to solid copper
- ...Won't break, crack, flake or peel
- ...Long life under adverse conditions
- ...Exceeds most design requirements
- ...Uses standard copper terminations and lugs
- ...Excellent theft resistance

Ask your Copperweld representative or authorized agent for samples, specifics about particular applications, or more information.

### Product specifications

- ASTM B-193, ASTM B-452, ASTM B-227, ASTM B-228 and ASTM B-910 certified
- NRS 102 Theft deterrent earthing materials
- All bimetallic products are processed at the Copperweld®'s ISO9001 and ISO14001 certified facility in Fayetteville, TN





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