

Metric Cables: What's Happening?

Over the next few years, a federal policy initiated "way back" in 1988 is going to increase your awareness of metric sizes. But don't throw away your American Wire Gauge (AWG) tables...just yet.

We use metric-sized film in our "35 mm" cameras and measure fiber optic cable in "meters" without a second thought. However, there is still very little enthusiasm to adopt the metric system entirely.

Wire and Cable specifiers use degrees "Centigrade" on a daily basis, whereas the general public still refers to "degrees Fahrenheit." Another example of metrics in action: for years it has been common to use the old Roman units "MCM" (1000 circular mils) to refer to cable sizes. Some people still refer to these units, but the correct metric terminology is "kcmil." Reluctance to use "kilometers" instead of "miles", and "liters" instead of "gallons" *are* a few more examples of people not willing to make the change just yet.

The U.S. is the only industrialized nation in the world that doesn't use metric units as its primary measurement system. In an era of global markets and competition, that could represent a serious trade disadvantage.

Bill Brenner, an executive director at the National Institute of Building Sciences (NIBS) says, *"To enhance U.S. global competitiveness, the federal government is encouraging metrication of U.S. industry by moving to metric units in federal purchasing specifications"*.

What does this mean to you? For the near term, the differences will be mostly on paper. Wire and cable is somewhat immune from a so-called "hard" conversion, which would

CONDUCTOR AREA EQUIVALENTS

Nominal mm ²	AWG or kcmil	Actual mm ²
10	6	13.3
20	4	21.1
30	2	33.6
40	1	42.3
50	1/0	53.4
65	2/0	67.3
80	3/0	84.9
100	4/0	107
120	250	127
150	350	177
250	500	253
350	750	380
500	1000	507

Note that cross-sectional area measurements refer to the **actual** metallic conductor area. A 19-strand cable, for example, will have a slightly larger nominal **diameter** than a solid conductor will with the same conducting area because of the space between the strands of the cable.

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require the manufacture of wire and cable products to exact metric sizes. The need for a 30 square millimeter (mm²) conductor, for example, is not a major crisis, when a #2 AWG (which is actually 33.6 mm²) can be readily substituted in its place.

"For most building products, including power cable and building wire, physical dimensions won't change for quite a few years," says Brenner. "The effect of the federal policy will show up as dual labeling on invoices, billing and product marking." For example, a #2 AWG conductor with a nominal area of 33.6 mm² might be marked "#2 AWG/33.6 mm²."

Eventually, the National Fire Protection Association (NFPA) will probably change the National Electrical Code (NEC) to expedite metric cable recognition in the U.S. For the foreseeable future, however, dual markings will be the most visible signs of wire and cable metrication.

Below are some other metric conversion factors that are useful when specifying power wires and cables:

U.S. TO METRIC CONVERSION FACTORS

U.S. Units	Metric Units	To convert U.S. to metric multiply by	To convert metric to U.S. multiply by
Inches	mm	25.4	0.0394
Square inches	mm ²	645.16	0.00155
Circular mil	mm ²	0.000507	1973.5
Ohms/1000 ft.	Ohms/km	3.28	0.3048

Additional information on metrics can be found in Anixter's Wire & Cable Technical Information Handbook (part # 104113) and on the back of Anixter's Voltage Drop Calculator (part # 136419).