

Ask Jon Eakes

Pro: Wire Up-Sizing for Energy Efficiency and Cost Savings

Last Updated: Thursday, November 30th, 2000, Created: Thursday, November 30th, 2000

A fresh look at household wiring may change the wire sizes we use in some residential lines.

The electrical code establishes wire sizes based on fire safety considerations. When an electrical load is run through a wire, the resistance in that wire creates heat. The maximum amperage for a given wire is based on the maximum temperature that its insulation can safely handle. If you run that same current through a larger wire, there is less resistance, less heat, less energy loss.

Wires that run to large frequent motor or resistance loads, like refrigerators, air conditioners, furnace fans and baseboard heaters basically create hundreds of feet of warm wires running through the walls. Outside of the heating season this is a net loss and, even in the winter, wires outside the thermal envelope are a direct loss as well. In fact, warm wires running to air conditioners inside the thermal envelope force the air conditioners to work even harder.

Up-sizing wires one wire size cuts down energy losses by 35 to 40 percent. The increased cost for the wire usually has a payback of as little as one or two years to motor and resistance heating loads. Ordinary outlets and lighting circuits usually don't have a good payback. So upsizing the code No. 14 for the refrigerator and window air conditioner to a No. 12, and upsizing the code No. 12 for electric heaters to a No. 10 will save homeowners utility costs and are quickly cost effective.

Very few electricians talk about this, but homeowners are beginning to find out and when they ask you about wire up-sizing, you can let them know where it pays off and where it doesn't. For the mathematics and specific examples, check out *Wire-Upsizing* on the web site:
<http://energy.copper.org/onesizeup.html>

**Originally published as an article by Jon Eakes in Home Builder Magazine, the magazine of the Canadian Home Builder's Association.

Keywords:

Electrical, Energy Conservation, Environmental, Wire, Wiring

Article 658

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