

# askthe experts

YOUR QUESTIONS—PRO ANSWERS

## experts



CJ Nielsen  
electrician



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### Need help?

Get answers you can trust from the experienced pros at FHB. Email your question to [Experts@FineHomebuilding.com](mailto:Experts@FineHomebuilding.com).

## Two-wire and three-wire plugs

**My house dates back to the 1950s. The electrical system includes a mix of grounded receptacles (three prongs) and what I assume are ungrounded ones (two prongs). The ungrounded receptacles work just fine, so I'm wondering if I need to upgrade them. What's the reason behind the grounding system?**

—GERRY KLINE  
via email

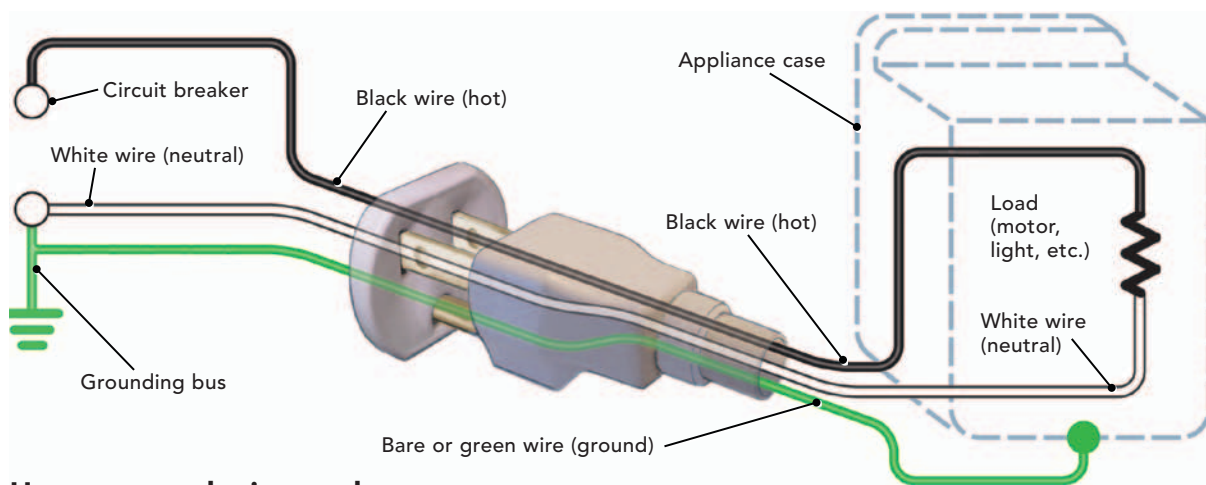
*CJ Nielsen:* Early 120v electrical systems were not required to have a ground prong. These systems consisted of only one hot and one neutral wire, and electrical appliances had plugs with only two prongs. The hot wire supplied the electrical current, and the neutral returned it to the source (the power plant) through the neutral wire at the street.

The three-prong, three-wire system—hot, neutral, and ground—became regular practice in the 1960s and is required by the National Electric Code for several applications. The difference between two-prong and three-prong receptacles is their ability to connect to an additional wire (technically known as a conductor) that runs to the grounding bus in the main panel. This conductor, known as the *ground*, is parallel to the neutral conductor, but normally doesn't carry any electricity.

So why do we need a ground? If a damaged, frayed, or loose wire comes in contact with anything metallic, it will treat this object as a conductor, thus electrifying it. Electrified metallic objects—which can be anything from a lamp base to a blender or a plumbing pipe—pose a deadly hazard of electrocution to anyone in direct contact with them.

The idea behind a grounded three-wire system is that all metallic objects are interconnected by the grounding conductor, which leads to the grounding bus, so if a damaged, frayed, or loose wire comes in contact with a metallic object connected to the grounding system, it will cause a ground fault (a short circuit) and trip the circuit breaker or blow the fuse.

Three-prong plugs are strictly for safety, and it's a good idea to upgrade to them. You can install a ground wire from new three-prong receptacles back to the panel, or replace the wiring on the circuits completely using standard two-conductor-plus-ground cable. The easiest approach, though, is to install three-prong GFCI receptacles, which trip when they detect a ground fault, with no ground wire in place. Be sure to use the stickers included with the GFCI to mark it “no equipment ground.”



### How a ground wire works

Attached to any metal part of an electrical system, a ground wire provides a path to the panel that parallels the neutral wire. Should a hot conductor contact a metal part it's not supposed to (a lamp

base or a washer cabinet, for instance), the ground wire will carry the current to the grounding bus, creating a short circuit that trips the circuit breaker and protects people from electrocution.

## White-painted chimneys

I've seen many historic homes along the New England coast that have had their brick chimneys painted white beneath a black cap. I'd like to replicate the look. Is there architectural significance to this detail? I've heard this referred to as a "Tory chimney," and that it was used during the American Revolution to symbolize that a Loyalist lived at the home.

More importantly than the history, would I cause any damage to the brick by painting it? What type of paint do you recommend that I use?

—ROB Y.  
via email

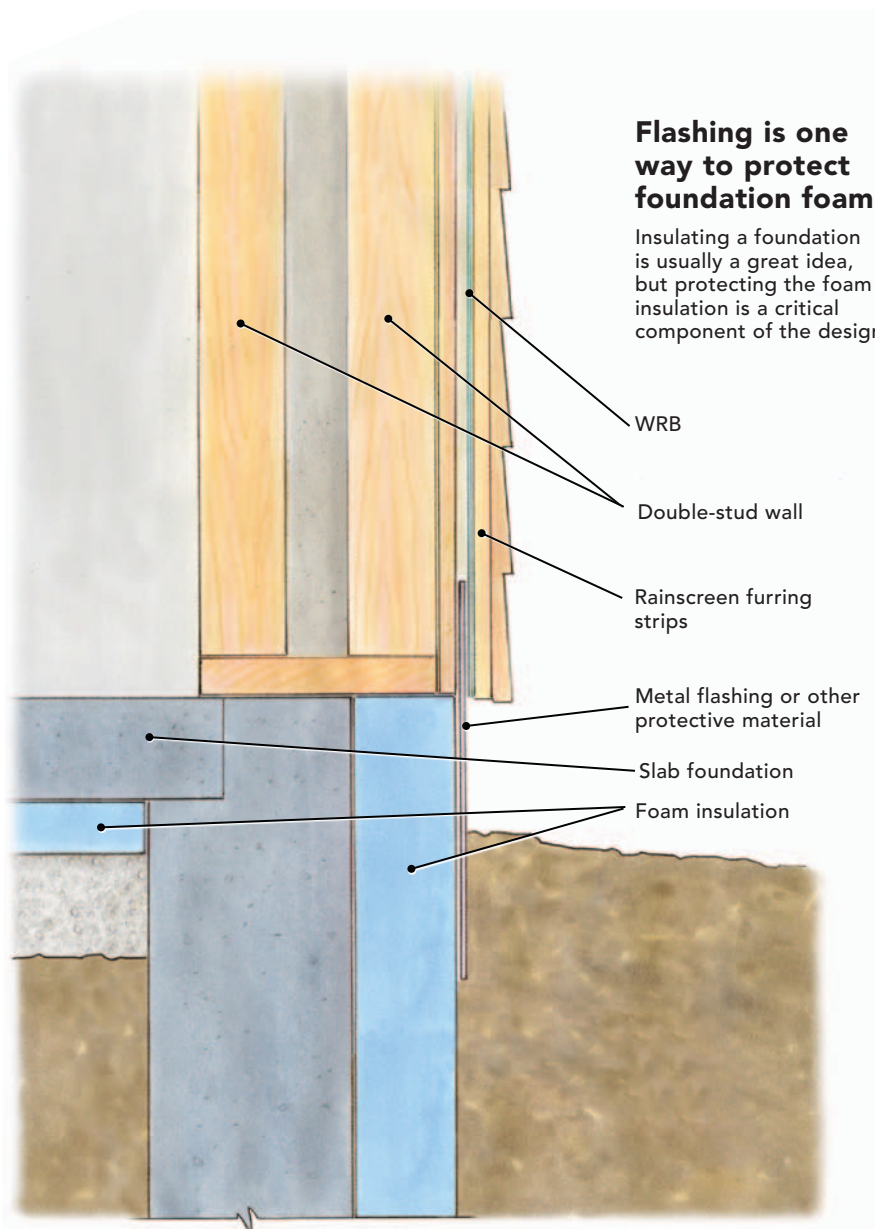
*Mason Lord:* The painting part of the question is relatively straightforward. Avoid using an oil or latex paint. There is too much risk of trapping moisture and causing



**It's not black and white.** White chimneys probably have no historical significance, but the paint you use can have a big impact on the masonry's longevity.

the brick to spall during the freeze-thaw cycle. Also, it's likely these finishes won't be durable. Who can afford to have a painter set up on a roof every five to ten years to prep and recoat?

There are two German companies, Keim and Beeck, that produce vapor-permeable mineral-based paints that penetrate and chemically react with the masonry substrate. Buildings painted with Keim paints in the 19th century are still in excellent con-



### Flashing is one way to protect foundation foam

Insulating a foundation is usually a great idea, but protecting the foam insulation is a critical component of the design.

dition today according to their website, and both white and black are included in their color charts.

The first part of the question is less clear. Many online sources repeat the Tory-chimney anecdote. Being a skeptic as well as a specialist in historic houses, I turned to trustworthy sources, speaking with several architectural historians of note. My expert colleagues have never found this information in any texts and believe it to be an after-the-fact tale, possibly started during the nostalgia of the colonial revival period of architecture in the late 19th and early 20th centuries.

## Protecting foundation insulation

**We are in Minnesota (Zone 6a) and building a 2200-sq.-ft. slab-on-grade home. It will have a 10-in.-thick double-stud wall that cantilevers 4 in. beyond the foundation to sit flush with the outside face of the 4-in. foam applied to the edge of the slab. I plan to protect the foundation insulation using painted aluminum flashing nailed to the sheathing and extending down below the backfill. All the wall finishes will lap the flashing. It's inexpensive, I can choose a nice color, it's suitable for a**

below-grade application, and it's durable enough to protect the foam pretty much forever. Actually, it seems too easy, which makes me immediately wonder—what am I missing?

—SCOTT K.  
via [greenbuildingadvisor.com](http://greenbuildingadvisor.com)

*Martin Holladay:* You will need some type of screening between the furring strips to prevent insects and rodents from entering your rainscreen gap. But except for that, your planed approach doesn't raise any red flags.

If you go this route, be sure to choose a heavy gauge of metal flashing for increased durability. The possible disadvantages are that the metal flashing can get dinged up over the years, leaving the bottom of your house looking like a metal entry door that someone has tried to kick in. The thicker the flashing, the less likely it will look dinged up.

There is no perfect answer to the question of how to protect above-grade exterior foam. While metal flashing is a good solution, it's not the only possibility. Here's a list of materials that can be used to protect the above-grade portion of the exterior rigid foam used to insulate a foundation wall:

- A brush-applied cementitious coating or cementitious stucco (for example, Styro Industries Brush On ST), with or without metal lath
- A trowel-applied cementitious coating that includes chopped fiberglass (for example, Quikrete Foam Coating or other surface-bonding cement)
- An acrylic coating like Styro Industries FlexCoat or Styro Industries Tuff II
- An exterior insulation and finish system, or EIFS (synthetic stucco)
- Cement backerboard, with or without a layer of stucco
- Pressure-treated plywood
- A fiberglass panel like GroundBreaker from Nudo Products
- Styro Industries FP Ultra Lite panels (XPS with a coating of mineral granules adhered to one side)
- Protecto Wrap Protecto Bond (a flexible peel-and-stick membrane with a textured, gritty coating)
- ProGuard Concrete Insulated Sheathing