



The 2008 NEC Tamper Resistant Code Requirement: You have questions? NEMA has Answers!

How did the Code change come about?

Approximately 2,400 children receive emergency room treatment every year for injuries caused by inserting objects into electrical receptacles, according to U.S. Consumer Product Safety Commission (CPSC) data. This equates to *about seven children each day*. Injuries range from electric shock to first-, second- and third-degree burns. And, although rare, some cases prove fatal.

In response to these statistics, the *National Electrical Code*® (NEC) has been revised to require that all receptacles—or outlets—in new residential constructions be tamper resistant. Child safety presents a major concern for electrical manufacturers, and tamper-resistant receptacles have long been considered the most reliable means of protection. Although not widely used in homes, tamper-resistant receptacles have been required in pediatric care areas for years.

What does the new Code state?

The revision, taking effect with the 2008 NEC, says:

“406.11 Tamper Resistant Receptacles in Dwelling Units. In all areas specified in 210.52, all 125-volt, 15- and 20-ampere receptacles shall be listed tamper resistant receptacles.

Substantiation: 210.52 specifies the areas in dwelling units where receptacles shall be installed. This proposal references those areas.”

How will this Code change affect the industry?

Upon adoption, the Code will have a profound impact on new construction installations, since all 125-volt, 15- and 20-ampere electrical receptacles in single- and multi-family homes will need to be tamper-resistant.

Where do most accidents happen?

CPSC data indicate that about 71 percent of electrical incidents occur at home, with adult supervision typically present.

What types of objects are commonly inserted into receptacles?

Children insert a wide variety of metal objects into receptacles, including paper clips, pens, safety pins, screws and nails, tools, wire, forks, tweezers, hair pins, keys, knives, coins and more. The two most common objects inserted are keys and hairpins—items that children can access easily and that parents don’t often consider dangerous. Even “safe” items can pose electrical hazards.

Who is at risk?

It's estimated that 89 percent of injuries occur in children less than six years old, and toddlers make up about half of the victims. Boys carry the greatest risk, regardless of age.

How severe are the injuries?

CPSC data indicate that about 94 percent of injuries involve burns. These range in severity, but a significant number of serious and fatal incidents result—and even minor injuries can leave emotional trauma. Pediatric burns can be particularly serious, because the skin is thin and offers little resistance to electric flow or heat. With infants and toddlers, the frequent presence of saliva creates an ideal environment for electric flow, making burns and scars more severe.

How do tamper-resistant receptacles work?

Tamper-resistant receptacles have built-in shutter systems that prevent foreign objects from touching electrically live components when they're inserted into the slots. The shutters protect against electrical burns without impairing normal plug insertion, removal or function.

Are tamper-resistant receptacles 100 percent tamper-proof?

Tamper-resistant receptacles have mechanical shutters that prevent insertion of such single-pronged objects as hairpins, keys, and nails. Data show this to be the most common cause of electrical injuries in young children. The devices don't protect against two single-pronged items inserted simultaneously—the shutters would interpret that situation as a two-pronged plug, allowing insertion.

Determined adults and adolescents could potentially bypass the mechanism with significant effort. However, UL test standards ensure integrity and performance under normal circumstances.

Would tamper-resistant receptacles protect against partial plug insertion?

Tamper-resistant receptacles function just like standard receptacles in this situation. Plugs that aren't fully inserted expose portions of the blades that are in contact with the receptacle's live terminals. Under some conditions, the gap between the plug face and receptacle face may be large enough for small fingers to contact these live blades.

Proper ground fault circuit interrupter (GFCI) protection would prevent current flow to ground, but preventive measures should be taken to keep small children from playing with and inserting appliance plugs.

Is it harder to insert or remove a plug from a tamper-resistant receptacle?

Recent testing by several device manufacturers found no appreciable difference for insertion and removal forces between tamper-resistant and non-tamper-resistant receptacles. However, bent, damaged, or burred plug blades *can* make insertion more difficult. To ensure proper function, users should examine and straighten or replace substandard plug blades.

Where's the proof that tamper-resistant receptacles offer greater protection?

Hospitals have required tamper-resistant receptacles in pediatric wards for more than 20 years. In addition, European electrical receptacles often incorporate tamper-resistant shutters for intrinsic safety. Tamper-resistant receptacles are:

- UL listed – subjected to intense, documented testing procedures
- Permanent – once installed, they offer continuous protection, unlike plastic outlet caps that can be removed or forgotten
- Reliable – this hard-wired solution eliminates the worry about inserting, losing or breaking the device
- Automatic – protection remains, even with plug or cord removal

How much will it cost to install tamper-resistant receptacles?

NEMA estimates that tamper-resistant receptacles will add less than \$50 to the cost of a new home's electrical system. Many parents spend more for a child's car seat!

Can I retrofit an older house with tamper-resistant receptacles?

Absolutely. Installation of tamper-resistant receptacles is identical to installation of standard receptacles, and tamper-resistant receptacles are completely interchangeable with standard ones.

Could tamper-resistant receptacles be used in correctional facilities?

Tamper-resistant receptacles aren't intended to provide full protection against situations encountered in psychiatric or correctional facilities.

How can I identify tamper-resistant receptacles?

Underwriters Laboratories (UL) standard 498 requires "Tamper Resistant" or "TR" to be marked *"on the device where visible after installations with the cover plate removed,"* meaning that every tamper-resistant device must display an appropriate marking that's visible with the wall plate removed.

Could tamper-resistant receptacles be used instead of GFCIs?

Tamper-resistant receptacles don't replace GFCIs. A GFCI senses current leakage to ground and shuts off power, preventing electrocution. The NEC requires GFCIs, and they should be used in conjunction with tamper-resistant receptacles.

How quickly might states and municipalities adopt the Code?

Most states and municipalities could be expected to adopt the 2008 NEC within two years. Historical adoption rates indicate that about 50 percent of the states will adopt the Code in 2008, and that 80 percent will likely adopt by 2009.

How are electrical manufacturers preparing?

NEMA-affiliated manufacturers are designing and tooling all residential products necessary for the 2008 NEC implementation, with some devices already available for purchase. These manufacturers will be prepared to meet customer needs and ensure a smooth transition for the Code change well in advance.

NEMA has developed its Real Safety campaign to raise awareness of the tamper-resistant Code change and related child safety issues. The campaign educates homeowners and electrical and building professionals, encouraging them to contact electrical associations and local and state legislators to advocate Code adoption.

Where can I go to learn more?

- For NEMA's Real Safety campaign resources: www.childoutletsafety.org
- For manufacturer research and safety statistics: www.nema.org
- For U.S. incident statistics: www.cpsc.gov/library/neiss.html
- For the CPSC data sheet of electrical safety: www.cpsc.gov/cpsc/pub/pubs/524.html
- For Canadian incident statistics: www.phac-aspc.gc.ca/injury-bles/chirpp
- For the *Consumers Union Report on Outlet Caps*:
<http://www.consumersunion.org/products/childsafeny698.htm>
- For the State Farm report on home electrical safety:
http://www.statefarm.com/learning/child_safety/learning_childsafety_elec.asp

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