



# Code Compliant

*The 1999 National Electric Code and what it means to you.*

BY GEORGE DOLL



**S**INCE 1993 we have worked to bring you the safest, most code-compliant means of installing electrical signs possible. We put into place an Electric Sign Advisory Board

so that everything we printed could be checked and double-checked before it would be passed on to you. This helps eliminate confusion and misinformation.

Over the years we've followed the NEC (National Electrical Code) to the letter, but never really explained why you should follow it. So why should this subject come up now, and why do we feel that your understanding of its direction is so important and noteworthy?

## THE CODE CYCLE

The codes in North America follow cycles. The Canadian Electrical Code (CEC) is published and updated every four years — in '86, '90, '94, and so forth. The U.S. code, or NEC, hits three-year cycles — '91, '93 and '96. The 1999 edition becomes law in many of our states and municipalities this month.

During the lapse of time between these cycles, manufacturers, life-safety people, listing agencies and sign companies have the opportunity to make this living law better by submitting ideas and theories to the various panels at the National Fire Protection Association in Quincy, Mass. This procedure has been going through this evolution since 1897.

Realistically, every person touching a wire is required to follow these codes. In the sign industry we are no different from any of the other electrical trades, so you must know that these codes are about to be renewed this month and know what they mean.

## CODE-CONCERNED

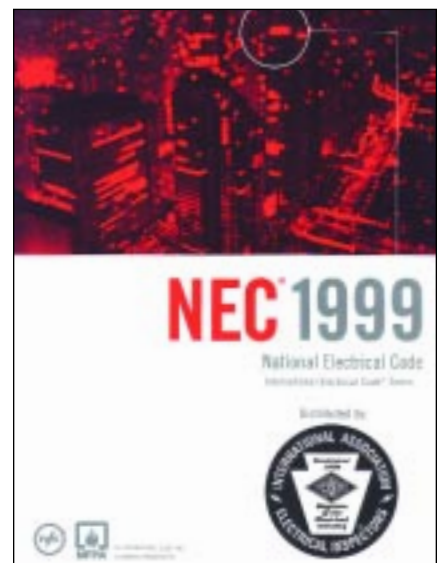
Why should we be concerned with the code? Well, we all know that many states, provinces and municipalities demand that we follow the code. This includes what type of materials we use and how they are to be installed.

The purpose of the code is the practical safeguarding of people and property from the hazards arising from the use of electricity. Ignoring this law of the land may put you and your company in jeopardy of losing your business and damaging life and property.

Many areas adopt the code exactly as it is written, while other areas may add more restrictions to what should be an industry Bible. The code, therefore, is the *minimum* acceptable book of rules, and nothing less is acceptable.

## MUDDY WATER

I'd rather not muddy the waters, but let me throw in some of the misconcep-



**I urge you to pick up a copy of the new 1999 National Electric Code (NEC), review it carefully, and abide by it. Contact Matt Dalske at the International Association of Electrical Inspectors (IAEI) in Richardson, Texas at (800) 786-4234.**

tions that seem to be plaguing our industry...

Many of the materials provided by the electrical industry are standardized to meet the code, but the problems in our electrical side of the house arise from the fact that many people are led to believe we are different by nature from the mainstream electrical community.

This difference has allowed dangerous and unorthodox products and applications to be introduced in opposition to the code, endangering the safety of our clients and their patrons.

We are also being inundated with letters and numbers from many listing agencies, which are so confusing to us that we don't know if these numbers are the law (code) or ordering numbers from a J.C. Penney catalog.

During this coming year we'll try and sort through this number confusion, but in the interim your main key to solving much of it is to read and understand the four pages that address our specialized industry in the new 1999 NEC code book.

These four pages aren't the end of our search. However, it's definitely a good start. Now, before we go into the chapter that pertains specifically to sign makers and some of its new additions, I would like to bring you up to speed on our position in this whole matter.

### ADOPTING THE NEC

We (which means my corporation, and the magazine through the Electric Sign Advisory Board) are adopting the '99 NEC. Why? Well, for years we've been following the code and trying to introduce you to its parameters.

We have had to turn down articles because, by publishing them, we felt we would be sending you the wrong message. The true message is that violating the code is unacceptable.

CONTINUED



These transformers from France (a), Ventex (b), MagneTek (c), Transco (d), Actown (e) and Allanson (f) are listed per the '99 NEC.

f  
COPYDOT ATTACHED ALLANSON  
FILM, DO NOT CUT - PLACE HERE -  
KEEP "F" IN LEFT CORNER

We have also had to avoid some applications being used in the installation of neon and electrical displays in favor of ones that were safe and code-compliant.

It may be true that states and municipalities are obliged to follow this law of the land, but our community consists of everyone involved in the electrical display industry all over the world.

We feel that we must help protect you and your clients, for this is the community of which we're part. We also firmly believe that by officially adopting the NEC, we can all hopefully be reading

from the same page, so to speak.

As any responsible community, we adopt this new code as our own. Remember, the code represents the *minimum* standards that we shall work at, but some communities may embrace additional restrictions.

### LOOKING AT THE CODE

To us, the most noticeable difference in the code was the size of the new book; instead of being 5 1/2" x 7 3/4", it's now 8 1/2" x 11".

No, I'm not trying to be funny, it's just



The new code states that, "Field installed skeleton tubing shall not be required to be listed where installed in conformance with this code." Though this is a big win for the sign industry, this type of installation still needs to be inspected by the authority having jurisdiction (AHJ). In fact, given this change, our responsibility to follow the code is even greater.

that I thought I knew all the changes that were taking place, and when I received my new copy I was kind of taken aback by its size. It just won't be able to ride on the dashboard of my Toyota 4x4 like all the others have.

Almost every chapter in this book concerns us, and I don't want to convey that thought to you any differently. However, besides Article 250 (Grounding), Article 600 (Electric Signs and Outline Lighting) affects us the most.

I can't cover most of the changes in this article and shouldn't try to, for this is something you need to study yourselves. But let me initially prime you for some of the new points you'll discover.

**Big Point #1:** 600-3 Listings, exception (a). This is an adjusted issue to the code, "Field installed skeleton tubing shall not

be required to be listed where installed in conformance with this code."

This should be a big win for us the electrical sign installation companies and the public at large if we treat it right. I want to caution you that this doesn't mean that it doesn't have to be inspected by the authority having jurisdiction (AHJ).

In fact, I see this exception demanding that we all have to take our responsibilities far more seriously, and that also goes for the inspection community at large.

We have to fully understand what we're doing when it comes to border neon and skeleton-type electrical displays. Therefore, we are going to make this one of the priorities to address during the upcoming year.

**Big Point #2:** 600-7 Grounding. Most

**CHAPTER 6**  
**Special Equipment**

**Article 600—Electric Signs and Outline Lighting**

**A. General**

**600-1. Scope.** This article covers the installation of conductors and equipment for electric signs and outline lighting as defined in Article 100.

**FPN.** As defined in Article 100, electric signs and outline lighting includes all products and installations utilizing neon tubing, such as signs, decorative elements, skeleton tubing, or art forms.

**600-2. Definitions.**

**Electric-Discharge Lighting.** Systems of illumination utilizing fluorescent lamps, high intensity discharge (HID) lamps, or neon tubing.

**Neon Tubing.** Electric-discharge tubing manufactured into shapes that form letters, parts of letters, skeleton tubing, outline lighting, other decorative elements, or art forms, and filled with various inert gases.

**Sign Body.** A portion of a sign that may provide protection from the weather, but is not an electrical enclosure.

**Skeleton Tubing.** Neon tubing that is itself the sign or outline lighting and not attached to an enclosure or sign body.

**600-3. Listing.** Electric signs and outline lighting—fixed, mobile, or portable—shall be listed and installed in conformance with that listing, unless otherwise approved by special permission.

(a) Field installed skeleton tubing shall not be required to be listed where installed in conformance with this Code.

(b) Outline lighting shall not be required to be listed as a system when it consists of listed lighting fixtures wired in accordance with Chapter 3.

**600-4. Markings.**

(a) **Signs and Outline Lighting Systems.** Signs and outline lighting systems shall be marked with the manufacturer's name, trademark, or other means of identification; and, input voltage and current rating.

(b) Signs and outline lighting systems with incandescent lamp holders shall be marked to indicate the maximum allowable wattage of lamps. The markings shall be perman-

ently installed, in letters at least 1/8 in. (16.35 mm) high, and shall be located where visible during relamping.

**600-5. Branch Circuits.**

(a) **Required Branch Circuit.** Each commercial building and each commercial occupancy accessible to pedestrians shall be provided with at least one outlet in an accessible location at each entrance to each tenant space for sign or outline lighting system use. The outlet(s) shall be supplied by a branch circuit rated at least 20 amperes that supplies no other load. Service hallways or corridors shall not be considered accessible to pedestrians.

(b) **Rating.**

(1) Branch circuits that supply signs and outline lighting systems containing incandescent and fluorescent forms of illumination shall be rated not to exceed 20 amperes.

(2) Branch circuits that supply neon tubing installations shall not be rated in excess of 30 amperes.

(3) **Computed Load.** The load for the required branch circuit shall be computed at a minimum of 1200 volt-amperes.

(c) **Wiring Methods.**

(1) **Supply.** The wiring method used to supply signs and outline lighting systems shall terminate within a sign, an outline lighting system enclosure, a suitable box, or a conduit body.

(2) **Enclosures as Pull Boxes.** Signs and transformer enclosures shall be permitted to be used as pull or junction boxes for conductors supplying other adjacent signs, outline lighting systems, or floodlights that are part of a sign, and shall be permitted to contain both branch and secondary circuit conductors.

(3) Metal poles used to support signs shall be permitted to enclose supply conductors, provided the poles and conductors are installed in accordance with Section 410-15(b).

**600-6. Disconnects.** Each sign and outline lighting system, or feeder circuit or branch circuit supplying a sign or outline lighting system, shall be controlled by an externally operable switch or circuit breaker that will open all ungrounded conductors. Signs and outline lighting systems located within freestands shall have the disconnect located in accordance with Section 680-12.

*Exception No. 1: A disconnecting means shall not be required for an exit directional sign located within a building.*

This is the article in the '99 NEC that pertains to the sign industry. Though this article is specific to signs and outline lighting, every article that precedes this one is equally important. For example, Article 250, which addresses grounding, needs to be followed as closely as Article 600.

of this section is totally rewritten, and there isn't enough space in this column to do it justice. However, for the most part it's a good rewrite.

One item that we want to direct your attention to is that listed flexible metal conduit or listed liquidtight metal conduit may be used as a bonding means with lengths up to 100 feet. This does not eliminate or supersede Article 600-32 (J), which says, "...not more than 20 feet of high-voltage cable shall be permitted in metal conduit or tubing from a high voltage terminal..."

**Note:** I would like to add that if we have gotten across the point of the six-foot rule and the use of pipe in your installations, please don't start adjusting your work habits to fit this passage, because its rewrite is a *minimum* standard.

The rest of the electrical industry lives by the six-foot rule on flexible metallics (when they're used as a grounding source). Therefore, for the standardization of that industry — and because the concept of our people wrapping 100 feet of flex around a sprinkler system scares the heck out of me — I personally will continue to apply Article 350 (Flexible Metal Conduit) and Article 351 (Liquidtight Flexible Metal Conduit) to every project Vermont Sign tackles.

**Big Point #3: 600-23 Secondary Circuit Ground Fault Protection (SCGFP).** This issue is a *big one* for our industry. I know that SCGFP is a mouthful, but it's a lot more than that.

When this issue was introduced back in the '96 code cycle as Secondary Ground Fault Protection (SGFP), there was little or no product in the market place to support this section. Therefore, the cities and states didn't pay it much heed.

Well my friends, today it's a different story, and this article of the code is upon us. Not only do we have Secondary Circuit Ground Fault Protection transformers readily available, we also have isolated transformers that meet this code compliancy issue.

Like the Borg in Star Trek would say, "You must comply — resistance is futile."

This whole section looks something like this:

**600-23. Transformers and Electronic Power Supplies.**

**(a) Type:** *Transformers and electronic power supplies shall be identified for the use and shall be listed.*

**(b) Secondary Circuit Ground Fault Protection:** *Transformers and electronic power supplies other than the following shall have secondary circuit ground fault protection.*

*(1) Transformers with isolated secondaries and with a maximum open circuit voltage of 7,500 volts or less.*

*(2) Transformers with integral porcelain or glass secondary housing for the neon tubing and requiring no field wiring of the secondary circuit.*

**(c) Voltage:** *Secondary circuit voltage shall not exceed 15,000 volts, nominal, under any load condition. The voltage to ground of any output terminals of the secondary circuit shall not exceed 7,500 volts, under any load conditions.*

**(d) Rating:** *Transformers and electronic power supplies shall have a secondary circuit current rating of not more than 300 milliamperes.*

**(e) Secondary Connections:** *Secondary circuit outputs shall not be connected in parallel or in series.*

Maybe this will give you some taste for what the New Year brings us. As I had previously stated, there is just no way that we could possibly cover the new changes in the code in one column and do it justice. There are 26 changes in the new '99 code, and we've barely scratched on three of them.

### PREPARING FOR A NEW YEAR

So what can we do to prepare for the New Year and the Year 2000, besides checking our computer for the date and time situation?

The first thing I would suggest is that you pick up the new '99 NEC book.

The easiest way of doing that is by contacting Matt Dalske at the International Association of Electrical Inspectors (IAEI) in Richardson, Texas — (800) 786-4234 — and ordering a copy.

Then, sit down by a nice fire (Hawaiians are exempted from this procedure) and review all the changes that are taking place, because this is what our installations are going to have to comply to.

Second, as we continue our series on high voltage wiring and neon border installations, compare your notes to the code so that the profession we have all chosen can be made a safer, more professional and profitable one.

Happy New Year,  
Geo...

*This article has been passed for review before publishing to various state and provincial electrical inspectors, manufacturers, electrical safety associations, corporate/industrial safety officers and the INA "Codes and Installation Forum".*

*George Doll is president of Vermont Sign, Essex Junction, Vt., as well as a working electrician, a licensed electrical contractor, and an active member of the International Association of Electrical Inspectors (IAEI). George moderates the International Neon Association's Codes & Installation Forum on*

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*the Internet. George will be giving installation and safety seminars at **The Sign Business Show** in Orlando, Fla., April 8-10. George will also give a seminar on the basic tools and knowledge needed to add electric signs to your sign shop.*