



THE WIRE

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SEPTEMBER 2023

The Presidents' Letter

It is that time of year for the ECHL to resume meetings and continuing education classes for the 2023/2024 term. I hope all our members had an enjoyable, safe, and productive summer. Our first meeting for this term is scheduled for Monday September 11, 2023 at the Elks Lodge located at 2824 Klondike Lane. The meeting starts at 7:00 pm with sign-ins beginning at 6:30 pm. Hope you will be able to attend.

Over the summer, I was appointed to the Housing, Building, and Construction task force to explore making a recommendation for the adoption of the National Electrical Code (NEC) to the Department's Advisory Committee. The Task Force was composed of IBEW, contractors, electrical inspectors, Home Builders, IEC, and the ABC. The Task Force met 3 times and reviewed any requested changes to the 2020 and the 2023 code. After the third meeting, a vote was taken and a unanimous recommendation was made to adopt the 2023 code with no amendments. The Electrical Director will pass this recommendation on to the Advisory Committee and the Commissioner. The Commissioner will then begin the adoption process with the state legislators. I will go into more detail at the September meeting.

I will be giving the continuing education presentation at the September meeting. I will be discussing some of the most significant changes to the 2023 NEC. In addition, I will be comparing the 2023 edition to both the 2017 and 2020 codes. I hope you will be able to attend and please come with questions. Regarding our meetings, do not hesitate to request a particular topic be covered. Members' suggestions resulted in most of the topics covered last session.

As Always Stay Safe and Work Safe
Steve Willinghamurst
ECHL President

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SEPTEMBER 11, 2023 Code Program

Sign-in 6:30 P.M. - Program at 7:00 P.M.
ELKS LODGE # 8 - 2824 KLONDIKE LN -

Our September program will be presented by Steve Willinghamurst. Steve will elevatored on the comparisons/ differences/proposed changes between the most recent National Electric Code proposals.

I feel confident that Steve will be peak your interest in the overall presentation, he seems to have a way to keep any subject interesting.

We encourage you to ask questions.

Bring a friend and enjoy the program.

Dennis Steir will also go over the Code Questions in the September 2023 Wire.

Supporting our Industry

**** Electrical Equipment Needed ****

ECHL is committed to supporting the electrical industry and the training required to further the trade. In doing so, we ask for your old equipment / inventory to use for training.

ECHL contractors and or suppliers - if you are cleaning out your old Inventory and have material (electrical Equipment) that is taking up space in your warehouse, the Iroquois High School Electrical Program is seeking material that can be used for teaching students about electrical products they may encounter in the field. Educating our future apprentices is the goal.

IEC is the hub for most of the surrounding area's for the electrical trade training schools. She has contacts for Jefferson County, Bullitt County, to Hardin County.

If you would call, Erin Pretorius or Stephanie at 502-493-1590 or email Erin at erin@iec-kyin.com to make arrangements for pick up or delivery.

Old or new! - Thanks for your support!

SEPTEMBER Code Questions

1. All appliances supplied by _____ volts or higher shall be listed. Where would you find this answer in the 2017 NEC?

- A) 100 C) 50
B) 150 D) 240

Section _____

2. What type of portable cord would be allowed for temporary wiring at a carnival, circus, fair or similar event subject to physical damage? Where would you find this answer in the 2017 NEC?

- A) SPT-2 C) SEOW
B) SP-1 D) SJ

Section _____

3. Can a NEMA 12 rated junction box be installed in a Class 1 Division 2 environment? Where would you find this answer in the 2017 NEC?

- Yes No

Section _____

4. How many amps can a 3 conductor #14 SJO flexible cord feeding a single phase 240 volt utilization equipment? Where would you find this answer in the 2017 NEC?

- A) 12 C) 18
B) 15 D) None of above

Section _____

5. What is the minimum bending radius of a Tray cable that is 3 inches in diameter? Where would you find this answer in the 2017 NEC?

- A) 15" C) 18"
B) 12" D) None of above

Section _____

Code Corner

Article 422 Appliances

The standard definition of word appliance is normally individual pieces of equipment for use "in the home to perform domestic chores." These would include stove, dishwasher, or refrigerator. Article 422 of the *NEC* expands the scope of this type of electrical equipment to include appliances that are fastened in place or cord and plug connected, such as air conditioning units, water heaters, dishwashers, heating appliances and infrared heating lamps.

Therefore, the definition in Article 100 has a more expanded view of what is exactly an appliance. It is defined as "utilization equipment, generally other than industrial, that is fastened in place, stationary, or portable; is normally built in a standardized size or type; and is installed or connected as a unit to perform one or more functions such as clothes washers, air conditioners, food mixing, deep frying and so forth.

Section 90.7 requires the installer check to ensure that the appliance has a label from a qualified electrical testing laboratory. In addition, if the appliances are supplied by 50 volts or higher, Section 422.6 requires that they are listed. Most of the appliances will have the wattage and sometime the amperes stamped or printed on them.

The 2020 NEC added new language to 422.5 requiring Class A GFCI protection on circuits 150 volts and less to ground and 60 amps and less have GFCI protection. Section 422.10 the branch circuit requirements capable of carrying appliance current without overheating under condition specified. The branch circuit shall not be less than the marked rating of the appliance, if it is a motor driven appliance and not mark you would need to go the Article 430 Part II for compliance.

Ceiling fans are covered under Article 422 as well, Section 422.18 cover support of and refers you back to 314.27 which requires a listed ceiling fan box for mount the ceiling fan. Part III of Article 422 covers disconnecting means for appliances 422.30 thru 34 covers all that would be required to meet the *NEC* requirements.

Hope everyone enjoyed your summer and I hope to see you at the next meeting in September.

Top Three Code Violations Louisville Metro Inspections SEPTEMBER 2023

These violations are costing you time and money.

1. NEC Article # 230.26 Point of Attachment

The point of attachment of the overhead service conductors to building or other structure shall provide the minimum clearances as specified in **230.9 and 230.24**, in no case shall this point of attachment be less than 3.0 m (10 ft) above finished grade.

2. NEC Article # 250.64(B)(2) Exposed to Physical Damage.

A 6 AWG or larger copper or aluminum grounding electrode conductor exposed to physical damage shall be protected in rigid metal conduit (RMC) intermediate metal conduit (IMC), rigid polyvinyl chloride conduit (PVC), reinforced thermosetting resin conduit Type XW (RTRC-XW), electrical metallic tubing (EMT), or cable armor.

3. NEC Article # 250.12 Clean Surfaces.

Nonconductive coatings (such as paint, lacquer, and enamel) on equipment to be grounded shall be removed from threads and other contact surfaces to ensure good electrical continuity or be connected by means of fittings designed so as to make such removal unnecessary.

You lose money when you are turned down on a project. It also cost you time, when you have to return to the job site to make the necessary changes to correct the violation, that too, cost you money. Time is money.

We hope this will help save you time and money on inspection fees by reviewing the articles and making sure you have not violated the code before calling for the initial inspection.

*Submitted by Arnold Hornback
Assistant Chief Electrical Inspector
Louisville Metro Dept of Codes and Regulations*

LG&E NEWS

Transformer Supply

This is a reminder of the distribution transformer supply issue that continues to exist. For the past year, electric utilities, including LG&E, have had difficulties obtaining transformers. In an effort to reduce the number of transformers used, LG&E has chosen to no longer install distribution transformers for the sole purpose of providing temporary electric service. This practice will remain in place for the foreseeable future. Doing so allows us to continue providing safe, reliable service for permanent electric service. However, if a transformer is in the vicinity of the construction site, please contact the appropriate electric locator to discuss possibilities.

*Submitted by Joel McCauley
Team Leader Electric Design Svcs
LG&E and KU Energy LLC*

8 Types of Electrical Conduit and Their Uses

Electrical conduit protects wires within a structure and is an integral part of large construction projects including data centers, underground transit systems, and bridges. Electrical conduit can be non-metallic and metallic, and different types fall within those categories. When selecting electrical conduit for a project, consider weight, corrosion resistance, cable fault resistance, fire resistance, cost, and availability, among many other factors.

What is Electrical Conduit?

Electrical conduit is a tube or raceway used to house and protect electrical wires within a building or structure. From Data centers to underground subways to ports and bridges, electrical conduit is an integral part of the modern world around us.

Depending on the application there are many different types available. The specified conduit for your project may be rigid or flexible and will offer varying degrees of protection from impact, corrosion, gases and vapors, moisture, fire and even electromagnetic interference, depending on the needs of the installation environment. Environments that are wet, highly corrosive, or hazardous typically require specialty conduit.

8 Types of Electrical Cont'd

Electrical conduit may also be permitted per the National Electrical Code (NEC) for use in direct encasement (or direct burial) in concrete, which is common in commercial applications. The ability to field bend conduit as well as its allowable support spacings will impact how many fittings (couplings, elbows, connectors) are needed for a project and also have a direct impact on cost.

METAL ELECTRICAL CONDUITS

Rigid Metal Conduit (RMC):

RMC is composed of heavyweight galvanized steel and installed with threaded fittings. Known for being very strong, RMC is unfortunately one of the more expensive electrical conduits when it comes to both materials and labor. Aluminum is another material used for RMC that may have additional coating applied to better resist corrosion.

Galvanized Rigid Steel (GRC):

Approved for indoor and outdoor applications, GRC is made from steel and is traditionally found in industrial and commercial applications. GRC has been a longtime industry standard and benefits from impressive impact resistance, as well as UV-stability and the ability to protect from EMI (electromagnetic interference). Unfortunately, its heavy weight and poor field handling make GRC particularly expensive to install and it can be highly susceptible to corrosion. GRC's conductivity makes it susceptible to fault conditions in which the conduit and wire may weld together.

Intermediate Metal Conduit (IMC):

Approved for the same applications as RMC, IMC is a steel conduit that is slightly lighter than RMC and rated for outdoor use. It can be more cost-effective than RMC, available threaded or unthreaded, and may or may not be coated. Compared to GRC and RMC, IMC has much thinner walls that can handle more wire fill but is more susceptible to kink. IMC only goes up to 4 inches in trade sizes, so it is significantly smaller than other conduits.

Electrical Metallic Tubing (EMT):

Thin-walled and unthreaded, EMT is typically made of coated steel and used in place of GRC in commercial and industrial applications, though it is commonly found in residential applications as well. It can also be made of aluminum and is approved for use in concrete but is not permitted to be installed where subject to physical damage. EMT is not able to offer the same level of protection as GRC. It is easily bent but cannot be field threaded because of its thinness. Common trade sizes run from .5 inch to 1.5 inches.

NON-METAL ELECTRICAL CONDUITS

Rigid Nonmetallic Conduit (RNC):

Non-metallic, unthreaded, smooth-walled tubing is available in multiple substrates including high-density polyeth-

ylene, PVC, and RTRC (fiberglass). The capabilities and specs vary by substrate but several forms of RNC are approved for underground or direct burial use.

RTRC Conduit:

Available in various wall thicknesses and threaded, RTRC (reinforced Thermosetting Resin Conduit), or fiberglass conduit is created by tension-winding strands of fiberglass over a rotating mandrel, before impregnating the strands with resin and curing under high temperature, resulting in high flexural strength and high-temperature range (including excellent handling in low temperatures), and the ability to retain its original shape after impact. Its support distances are comparable with GRC, PVC-coated steel, and aluminum electrical conduit. RTRC is significantly lighter in weight than traditional conduit materials, resulting in the lowest labor installation rates for most diameters per the National Electrical Contractors Association (NECA) Manual of labor units. In terms of raw material costs, it is one of the more affordable electrical conduit options. Phenolic RTRC meets NFPA 130 requirements and is suitable for specialty applications requiring low smoke, no flame, zero halogen, 2-hour fire-rated conduit for use in Class I Div 2 areas.

PVC Conduit:

Available in varying wall thicknesses and threaded, PVC is light and commonly used for applications requiring non-metal electrical conduit. PVC conduit is not recommended for use in direct sunlight due to poor UV stability. It is relatively easy to heat and field bend with the use of a hotbox conduit bender, but must be mounted to allow for expansion and contraction due to a high coefficient of thermal expansion, and may deform after installation in environments that are too hot. Traditionally PVC has been inexpensive conduit however in recent years it has become more expensive and harder to source due to ongoing supply chain issues. In these cases, American-made RTRC is often substituted.

Electrical Nonmetallic Tubing (ENT):

Thin-walled and corrugated, ENT (electrical nonmetallic tubing) is flame retardant but not fire rated. It is not approved for use in exposed locations but is commonly used inside walls or within concrete floors. Known for its extreme flexibility ENT can be field bent by hand without requiring any special tools or the application of heat. ENT is available in PVC in trade sizes up to 2 inches. Its support spacing is limited to 3 feet and within 3 feet of terminations.

The correct Conduit Should:

- Be durable and long-lasting
- Be fire-resistant as dictated by environment/application
- Allow for cables to easily be pulled to areas that may be inaccessible in the future, and unaffected by any pulling lubricants with limited or no burn-through
- Be cost-effective