ND State Electrical Board
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Find us at
www.ndseb.com

A Message From the Executive Director:

Hello, everyone! I hope everyone is enjoying our unseasonably warm winter!

We mentioned in the last newsletter the newly appointed Education Committee members of Adam Kidwell, Jeff Kirstein and Christian Opp representing the apprentice education, Tim Pull representing the master electricians, Ivan Maas representing the on-campus member, Brian Fuder representing the off-campus member, Brian Poykko representing the professional electrical engineers and Steve Mundahl representing the journeyman electricians. Again, we want to thank these individuals for volunteering their time and energy to help promote and be a part of the education for the electrical industry in North Dakota.

The Board has not received applications for the power limited electrician position who is certified as an instructor by a vocational education department. If there are power limited qualified individuals out there, let me know.

The committee had its first meeting and found subject matters to tackle. We'll report on more as the committee continues to do its work.

We added 3 additional NDSEB CEU classes to our regular 16 CEU class lineup this past year, so we want to applaud Scott Halle for his hard work and efforts to keep our CEU classes going. We want to thank all those who attended - we appreciate the information collected on the comment cards.

The Board, also in its pursuit in "promoting" the electrical industry, had Scott Halle and Ashley Windhorst do a teaching video for school age students on "how to wire a simple lighting control". They met with 4 students and Bob Heitkamp with Market Place for Kids in Fargo a few weeks ago to capture this video for Market Place for Kids to use as an online instructional video on electricity. We hope it's a success and will continue to work with Bob on future electrical educational opportunities.

I also had the opportunity to meet with the NECA contractors from ND. One of the concerns was unlicensed persons doing electrical work. This is an ongoing problem and we need the public's assistance in identifying where and who is performing this illegal work. So, if you know of an instance where this is happening, contact me and we certainly will investigate it. MIDCO was kind enough to produce a public service announcement on the importance of hiring licensed electricians and the ad will run for approximately 3 months across ND.

If you have more ideas on areas we can improve, we encourage your input on electrical happenings in ND. If you have questions or comments, please send an email or give me a call as I'd like to visit with you!

Hope you are having a great winter and be safe out there!!

I wish you enough,
- James Schmidt

NORTH DAKOTA STATE ELECTRICAL BOARD SINCE 1917
Ensuring Public Safety Since 1917

Connections

Issue 266
March 2021

Flexible Cords and Flexible Cables

Flexible cords and flexible cables are commonly used in the electrical industry for many different applications, and for this article we will discuss the requirements as outlined in the National Electrical Code for their installation. Article 400 of the NEC addresses flexible cords and flexible cables. It is worth mentioning that flexible cords and flexible cables are not considered a Chapter Three wiring method. The requirements are found in Chapter Four – Equipment for General Use. The first three sections of the article direct us to ensure the installation complies with the requirements of the article and that the cords, cables, and fittings are suitable for the environment where they are being installed. Section 400.4 directs the user to Table 400.4 which describes the different types of flexible cords and flexible cables recognized by the NEC. If they are not included in the table the user would need to obtain special permission from the authority having jurisdiction prior to use. There is a lot of important information available to the installer in Table 400.4, so be sure to reference it when selecting cord or cable to ensure it is appropriate for the intended use. Verify the voltage rating is appropriate, that it is available in the required size, and suitable for the type of usage required - such as hard usage or extra hard usage. Note 9 of Table 400.4 tells us that cords with a "W" suffix are suitable for wet locations and are sunlight resistant.

It is important to remember when using flexible cords and flexible cables that the ampacity is determined by using Tables 400.5(A)(1) or 400.5(A)(2). Be sure to apply the appropriate table and column according to the type of cord or cable insulation, the temperature rating, and the number of current carrying conductors where applicable. These conductors are also subject to derating factors where installed in an ambient temperature other than 86° F. This is accomplished by applying the correction factor from Table 310.15(B)(1) corresponding to the temperature rating of the cord or cable. When there are more than three current carrying conductors, the ampacity is required to be reduced by the percentage given in Table 400.5(A)(3) based on the number of current carrying conductors. 400.5(A) also has some explanatory information to help you determine the number of conductors that should be counted as current carrying in the flexible cord or flexible cable.

400.10 provides us with a list of 11 areas where flexible cords and flexible cables are permitted by code to be installed, and 400.12 provides a list of 7 areas where they are not permitted to be used. Be sure to review these areas before deciding to use flexible cords and flexible cables to be sure the use is allowed as mistakes can be expensive, and the product typically can't be returned once it is cut to length. Where flexible cords or cables are used as permitted in 400.10(A)(3) & (A)(6) & (A)(8), they must be equipped with an attachment plug and energized from a receptacle outlet or cord body. They cannot be installed through holes in walls, floors, or ceilings. Also not through doors, windows, or similar openings as the cord or cable could be damaged, and if the damage occurs in a concealed area it could go unnoticed. Although 400.12(4) does not permit cords or cables to be attached to the building surface, there is an exception that directs you to 590.4 for temporary wiring, which does allow them to be supported in (J), and requires that flexible cords and cables shall not be installed on the floor or ground to prevent damage during construction. Flexible cords and cables are not permitted to be installed where concealed by walls, floors, or ceilings, or located above suspended or dropped ceilings, although the exception to (5) will permit them to be installed in these areas when contained within an enclosure for use in other spaces used for environmental air in accordance with 300.22(C)(3).

400.13 requires flexible cord to only be used in continuous lengths without splice or tap where initially installed as permitted in 400.10(A). The repair of hard-service and junior hard-service cord 14 AWG and larger shall be permitted if spliced in accordance with 110.14(B) and the splice retains the insulation, outer sheath properties, and usage characteristics of the cord being spliced. If a cord that had been previously damaged and repaired was disconnected and relocated to a new location, the distance would be limited

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again to only the unspliced length, since it could no longer contain a splice. Flexible cords and flexible cables must be installed so that there will be no tension transmitted to the conductor terminals. You must use cord grips and connectors designed to hold to cord safely and securely by the outer sheath, and sized appropriately for the diameter of the cord or cable. Cords and cables shall be protected from damage by installing bushings on connectors where passing through knockouts or openings in covers, boxes, or enclosures.

Part II of Article 400 details with the construction specifications for flexible cords and flexible cables, how they are constructed, and methods permitted for identifying the grounded and equipment grounding conductors. Part III contains the requirements for installations of single and multiconductor portable cables to connect mobile equipment and machinery at installations over 600 volts nominal.

We've covered some of the main topics regarding the installation of flexible cords and flexible cables. It is important for installers to review Article 400 to familiarize yourself with all the requirements applicable to your installation when installing them. Be sure cords are identified for the installation - for example, extra hard usage or wet location if applicable, and the fittings used are identified for the type and size of cord or cable you plan to install. Also remember to use the Tables in Article 400 appropriately to determine the size conductor required. You can't assume the flexible cord will be the same size as other types of conductors in the circuit, each components ampacity must be selected by the tables that apply to each specific part of the installation. Ø

ELECTRICIAN RATES	
MINIMUM RATE:	$75/HR
IF YOU WATCH ME:	$100/HR
IF YOU HELP ME:	$155/HR
CORRECTING YOUR MISTAKES:	$255/HR

News & Notes from NDSEB

CONTRACTING MASTER / CLASS B ELECTRICIANS:

If you are an active Master or Class B electrician, your license will expire on April 30, 2021 (unless you were first licensed or renewed after January 1, 2021).

Requirements to renew a "Contracting" Master or Class B license, and the reasons a license may be placed on "hold" status from renewing:

- Must meet acceptable continuing education - eight hours.
- Certificate of Liability Insurance must be current and on file.
- Past due violations / invoices.
- No response to start-up audit letter.

It appears we are always sending out several cease and desist letters after the April 30th expiration date, and it typically is just a matter of the contractor forgetting to renew. **We are strongly encouraging all contractors to not wait until the last minute and get your license renewed today!**

E-CERT SYSTEM PAYMENTS:

Currently there are two (2) options for paying on certificates:

1. Deposit Account – a non-interest bearing account set up with the ND State Electrical Board. Funds need to be available in this account in order to submit final payment. Funds may be submitted by check or money order with a deposit slip to the ND State Electrical Board.
2. ACH (Automatic Clearing House) is an automatic withdrawal from your bank account.

When and how to submit payment on a certificate:

- Within fifteen (15) days of completion, use, or occupancy, whichever is first, the proper fee must be submitted.
- Under Certificates, click View Startup (Goldenrod).
- Click on the certificate number you want to pay.
- After you click on the certificate number, another window will open.
- At the top of the opened certificate, enter your job cost.
- Once the job cost is entered, scroll to the bottom and click pay, and then pay again to confirm.

Instructions for the e-Cert system are available on our website, www.ndseb.com, E-Cert, General Information or please feel free to contact the office with any questions.

UPDATED FORMS:

The ND State Electrical Board has finished updating our forms. Please visit our website, www.ndseb.com, Forms, for the latest version before you submit a form to our office. Please contact the office with any questions.

ELECTRICAL EXAMS:

Due to COVID-19 the testing sites are requiring social distancing and requesting you wear a mask. The exams now will be held Mondays and Tuesdays until further notice. The testing sites can accommodate up to 20 persons each exam day. If you're feeling the least bit ill, stay home - we're trying to keep a safe environment for all the test takers.

The exams on the 2020 NEC & ND Wiring Standards began January 2021.

See our website for dates and after your application is approved call our office to sign up for a day that fits your schedule.

APPRENTICES!!
Be sure you renew your apprentice registration by the end of each January. If you don't, your hours worked when you are not renewed are lost, and do not count towards your required apprenticeship working hours.

ND LAWS RULES AND WIRING STANDARDS CODE REQUIREMENT EXEMPTION!

At the January 27, 2021 ND State Electrical Board Meeting, after much discussion, the following code exception was adopted to the Laws, Rules, and Wiring Standards of North Dakota.

1. Exempted 24.1-06-03-01(7)(e). Metal raceway or metal clad cable (MC) requirements in dormitories designed to house more than sixteen people no longer applies. Ø

A Word from the Director of Inspections

Hope all is well, and everyone is staying healthy and busy.

NDSEB recently adopted the 2020 code on January 1st, 2021 and although there are a lot of big changes and additions to the 2020 NEC, I still feel one of the most important codes for electrical safety is Article 250. This is broken into 2 parts: Grounding and Bonding. Proper and correct sizing of the conductors relating to grounding and bonding are essential to creating the safest electrical installation possible. When you are talking grounding and bonding, it is important to use the proper terminology so you understand which part of NEC 250 you are looking for. I like to refer to Article 100, Definitions as there is a list of grounding and bonding definitions to look at to help you decide which part of NEC 250 you are dealing with.

Article 250 is extensive and detailed so I would like to touch on just a few items that seem to come up during inspections. 250.24(C) states "where an AC system operating at 1000 volts or less is grounded at any point, the grounded conductor (neutral) shall be routed with the un-grounded conductors and shall be connected to each disconnect. A main bonding jumper shall connect the grounded conductor and the enclosure". This article alone has a lot going on. First of all we are dealing with sizing of grounded conductor and bonding jumpers, so you will start at NEC 220.61 to calculate the minimum size neutral conductor, then you refer to Table 250.102(C)(1) and you must use the larger of the two options, then you will size your main bonding jumper or supply side bonding jumper off Table 250.102(C)(1).

Part III of Article 250 starts with NEC 250.50 and ends with NEC 250.70 and it deals with grounding electrodes and grounding electrode conductors which is really the starting point of your grounding and bonding safety. 250.52 (A) gives you a list or electrodes permitted for grounding and you need to pay attention to Table 250.66 for sizing your grounding electrode conductor.

NEC 250.90 thru 250.106 will help you understand bonding requirements, installation methods and proper sizing of bonding jumpers based on Table 250.102(C)(1). The most common violations we see regarding bonding is 250.97 "bonding for over 250 volts", 250.96 "bonding other enclosures" and 250.104 "bonding of piping systems and exposed structural metal".

Last, I would like to mention NEC 250.109 thru 250.126 "Equipment Grounding and Equipment Grounding Conductors". This is a very important code to pay attention to as we have found many violations during our inspections dealing with types of equipment Grounding conductors found in 250.118 which also takes you to other sections of the NEC and also size of equipment grounding conductors based on Table 250.122. Remember, if you are using a listed cable in your installation, you need to watch your overcurrent sizing to determine if the equipment grounding conductor is sized properly.

If you ever have any questions, please call your local inspector and they will help you out any way they can.

Thanks,

Doug Grinde

Making A Connection:

NDSEB District 8 Inspector Rich Wolfe

Born in Rugby, ND, Richard Wolfe grew up in Minot, graduated from Minot High School, and received his Associate of Applied Science Degree in Electrical Technology from NDSCS. He's worked for several contractors, power plants, and was a maintenance electrician for Cenex Harvest States before employment with the NDSEB in June of 1999. He is currently the District 8 Electrical Inspector.

Rich has been married to his wife Laurie for 35 years and has two children - daughter Katie (33) and son Rylan (31). He also has six grandchildren.

What is your favorite part of your job? *The different places and people you meet everyday. Also, the variety of electrical projects a person sees on a daily basis.*

What do you think is the greatest challenge facing the electrical industry today? *Keeping up on the changes in technology and new products that are out there, but yet still having a knowledge and understanding of older methods and equipment still being used today.*

If you couldn't do your current job, what would you want to do instead? *Professional golfer.*

Do you have any advice for new electricians just starting out in this industry? *This is a great career choice and job opportunity. Like any new job, you need to ask questions of coworkers and inspectors and attend continuing education classes so you will be prepared to go out to any jobsite.*

What would be your dream vacation? *Summer in Alaska, or exploring the countryside of Germany.*

What do you like on your pizza? *Everything.*

What's your favorite TV show? *Blacklist.*

The best movie of all time is . . . *National Lampoon's 1st vacation movie to Wally World* Ø