



2020 National Electrical Code® Code Change Analysis

by Paul W. Abernathy, CMECP® and Encore Wire Corporation

Volume 1, Issue 1 – Changes in the 2020 National Electrical Code®

Understanding and applying the many changes that take place when the *National Electrical Code*® [NEC®] gets updated every 3 years can be stressful and a confusing time for even the most proficient user of the *Code*. Our goal is to help reduce the stress of learning the NEC® by explaining the changes in a clear and accurate way.

This inaugural issue of this series we are going to start at the very beginning of the NEC® and work our way through some of the more significant changes. The next few issues will attempt to explain changes to *Article 90* and *Article 100*.

To fully understand the NEC® the user must understand what ***is covered*** and what ***is not covered*** by the NEC®. *Article 90* is devoted to the introduction and explanation of what this document is and what it is not. In section *90.2(A)(5)* of the items “covered” by the NEC®, boatyards and marinas were added to clarify that all electrical installations from shore power to small crafts to moored floating buildings are covered by the NEC®, most notably *Article 555*. Another significant change is *90.2(A)(6)* making it very clear that exported power from vehicles, say to a premise as an alternate power source most notable in *Article 625*, are also covered by the NEC®.

Now that we explained the what ***is covered*** it is time to clarify what ***is not covered*** in terms of changes to the 2020 NEC®. We hate to build it up and then let you down, but the only change seen in the ***not covered*** is clarification. In *90.2(B)(1)* it was made clear that watercraft other than floating buildings are not covered by the NEC® as well as making it clear not all

automotive vehicles are excluded from the rules in the NEC®, such as mobile homes and recreational vehicles.

Other than the changes previously mentioned, *Article 90* came away from the 2020 NEC® development process with very few significant changes and only clarifications to its intent.

The true essence of understanding the *CODE* is to understand the definitions that are bound within its covers. In my over 30 years of teaching the *National Electrical Code*® I find that definitions are the most underrated aspect of mastering the NEC®. The definitions we find in *Article 100* help transform our understanding of how the various terms are used when applying the rules of a safe electrical installation. We will examine some of the more significant additions to the 2020 NEC® and *Article 100*.

The first change we must examine is the restructuring of *Article 100* into three parts. There is a new *Part III* which is specifically dedicated to definitions associated with Hazardous (Classified) Locations. While *Part I* still exists for General Terms and *Part II* for Over 1000V we have seen all definitions that in some fashion relate to Hazardous (Classified) Locations move to the new *Part III*. This is a welcomed attempt at keeping the NEC® organized.

Part I has seen a few new definitions added. The first being:

Attachment Fitting – *A device that by insertion into a locking support and mounting receptacle, establishes a connection between the conductors of an attached utilization equipment and the branch-circuit conductors*

connected to the locking support and mounting receptacle.

There was also added an informational note to remind the user that an attachment fitting is different from an attachment plug in that attachment plugs are associated with cords. The changes made in the 2014 and 2017 NEC® regarding the definition of a “receptacle” paved the way for this new self-locking device that is used on ceiling fans and heavy luminaires. We see the term “attachment fitting” used throughout the NEC®, such as in sections 314.27(E), 422.18 and 422.33 so it only stands to reason it would need clarity by adding the definition in Article 100. See Figure 1-1 for an example of an Attachment Fitting.

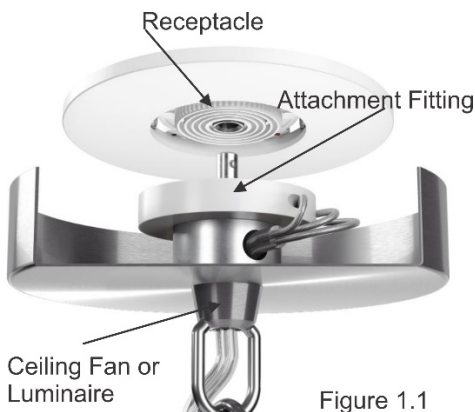


Figure 1.1

Dormitory Unit – A building or a space in a building in which group sleeping accommodations are provided for more than 16 persons who are not members of the same family in one room, or a series of closely associated rooms, under joint occupancy and single management, with or without meals, but without individual cooking facilities.

While the definition of Dormitory Unit was simply relocated to Article 100 from elsewhere in the code, it applied as many other articles in the NEC®, such as Article 210, 240, 406 and 500. Moving it to Article 100 will make the easier to interpret and apply.

Fault Current- The current delivered at a point on the system during a short-circuit condition.

In the 2020 Public Input (PI) stage of code development, “Fault Current” was presented as being “An objectionable current that flows due to an abnormal circuit condition”. This was an incorrect statement as it gave the impression that fault current could only be associated with objectionable current, which is incorrect,

we cover “objectionable current” rather well in 250.6 so this attempt at a definition was not in line with logic. You can have objectionable current exist without being considered fault current. This oversight was corrected in the Public Comment (PC) stage of code development.

Equipotential Plane – Accessible conductive parts bonded together to reduce voltage gradients in a designated area.

Up to this point those who truly understood what an “equipotential plane” is any why we do it may have been in the minority. We see this term used in Article 547, 680, and 682 and each application is quite unique, yet serve a similar goal. We are attempting to “mask” the differences of touch potential by reducing voltage gradients between two relative points of contact. The new definition will help to make it clear what is trying to be achieved.

Free Air (as applied to conductors) – Open or ventilated environment that allows the heat dissipation and air flow around an installed conductor.

By adding the definition of “Free Air” we can now apply the various rules for ampacity, such as in Table 310.17. The use of the term “Free Air” impacts not only Table 310.17 but other areas of the NEC® where wiring methods may be affected. For example, even in cable tray applications of Type MC Cable the term “free air” is used 330.80(B) and 392.80(A)(1), where applicable. Just knowing what “Free Air” means is a good start.

Island Mode -The operational mode for stand-alone power production equipment or an island microgrid, or a multimode inverter or an interconnected microgrid that is disconnected from an electric power production and distribution network or other primary power source.

The change from Stand Alone (Islanded) to Island Mode should help avoid any confusion when the operational mode is operating in “island mode” for various systems as described in the definition. As a result of the revised definition in Article 100 the definition found in 710.2 has been deleted.

Grounded Conductor – A System of circuit conductor that is intentionally grounded.

Informational Note: Although an equipment grounding conductor is grounded, it is not considered a grounded conductor. (cont.)

The most interesting thing about the change to the term “grounded conductor” was the informational note added by CMP 5. The informational note attempts to make it very clear to the installer that the “equipment grounding conductor” and the “grounded conductor” both are technically “grounded”, which the NEC® define as connected to “earth” or to a conductive body that extends the ground connection at some point on the electrical system. Understanding the difference roles each of these conductors perform is critical to safe electrical installations.

Habitable Room – *A room in a building for living, sleeping, eating, or cooking, but excluding bathrooms, toilet rooms, closets, hallways, storage or utility spaces, and similar areas.*

With the addition of the term “habitable room” I can bet there are building officials and inspectors rejoicing at the inclusion of this definition being introduced to *Article 100*. When encountering this term in the NEC®, such as section *210.70(A)(1)*, it should now be easier for inspectors to fairly and uniformly enforce the rules of the *National Electrical Code*®. For example, in *210.70(A)(1)* it requires at least one lighting outlet controlled by a listed wall-mounted controlled device in every “habitable room”, kitchen, and bathroom. The definition excludes kitchens as habitable rooms but in *210.70(A)(1)* it specifically requires the listed wall-mounted control device for the lighting outlet in kitchens. Therefore, it is critical to understand how one rule can be changed and modified by another within *Chapters 1 through 7 per 90.3*.

Messenger or Messenger Wire – *A wire that is run along with or integral with a cable or conductor to provide mechanical support for the cable or conductor.*

Believe it or not the use of a “messenger” has been utilized for decades without being specifically defined in the *National Electrical Code*®, except for the design considerations found in *692.2*, which served us rather well. However, since the term is used in various locations in the NEC® and to bring clarity to what exactly it is rather than how to design it the new definition was born. An early public input to the definition mentioned “or parallel” and was quickly removed in the public comment stage to avoid confusion with the term “parallel conductors” since the application of parallel conductors in *310.10* are to be “electrically joined at both ends” and a messenger wire isn’t necessary designed to be electrical joined at both ends or to any

other conductor for that matter. So, this last-minute change in the public comment stage was a good move.

Pier – *A structure extending over the water and supported on a fixed foundation (fixed pier), or on flotation (floating pier), that provides access to the water.*

The term “pier” is widely used in *Article 514* and *555* and was never truly defined. Without a definition of such a critical component of a specific installation it was imperative a definition was born.

Authors Note: The definitions for “Pier, Fixed” and “Pier, Floating” was also added to *Article 100* in case installers, not sure how, get the two terms confused.

Power Production Equipment – *Electrical generating equipment supplied by any source other than a utility service, up to the source system disconnecting means.*

When we think of all the possible electrical generating equipment we have today, such as generators, photovoltaic systems, fuel cells, wind generation, it is vital we know where one system stops, and another begins. This change makes clear the line of demarcation to any other electrical generating system, other than a utility service, is considered “Power Production Equipment”.

Reconditioned – *Electromechanical systems, equipment, apparatus, or components that are restored to operating conditions. This process differs from normal servicing or equipment that remains within a facility, or replacement of listed equipment on a one-to-one basis.*

Informational Note: The term reconditioned is frequently referred to as rebuilt, refurbished, or remanufactured.

What I can tell you is that during the final NEC® development stage, known as the nitmam’s, this definition and how it was going to be applied sparked, pun intended, a lot of debate. CMP 10 who has purview over *Article 240*, created many revisions that impact “reconditioned” equipment without a clear definition of what the term means. The new definition also impacts electrical equipment in *Article 695*, *700*, *701*, *702*, and *708* as well. Adding this definition will aid installers and maintenance professionals when reference is made to “refurbished” electrical equipment within the NEC®

This also helps the user better understand the implications of *110.21(A)(2)* regarding the required markings on “*refurbished*” equipment.

While the 2020 *NEC*® has relocated many existing definitions from the .2 sections of some articles, to conform to the NFPA Manual of Style, I will add a few in this edition. (cont.)

Class 1, 2 and 3 Definitions- Moved from 725.2

Electrical Datum Plane – Moved from 555.2

Electrical Datum Plane Distances – Moved to 682.5

Fuel Cell System- Moved from 692.2

Fuel Cell – Moved from 692.2

In next months issue we will begin to tackle the new definitions that have been added to the new Part III of Article 100. The new *Part III*, as previously mentioned in this issue, is specifically dedicated to definitions associated with Hazardous (Classified) Locations so we will pick the lessons up from there.

Notice: National Electrical Code®, NEC®, NFPA70® are registered trademarks of the National Fire Protection Association [NFPA] and should NEVER be taken as endorsements of this educational series in any way, shape, or form. The use of registered marks in this series are for educational purposes only.