2020 National Electrical Code First Draft ballot - IEEE position analysis
March 14, 2018
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The SCC18 committee met March 12-13, 2018 to vote on the 2020 National Electrical Code First Draft ballots. There were 16 code-making panel reports presented to the committee for consideration and deliberation, and direction was given to each external representative to vote in support, opposition or abstention for each of the hundreds of First Revisions (FRs). Input was received from two other IEEE committees, and the following provides information regarding the committee input and SCC18 actions on those few items, including four FRs with conflicting recommendations.

CMP-1 Actions:

SCC18 Chair Comments: The positions of SCC18, the 802.3 WG, and the PSSC WLS are in agreement.

SCC18 position on FR8757

Oppose FR8757 with the following statement:
"..To better serve the purpose of the Code…" is insufficient technical substantiation to justify the proposed revision to 90.3 and elimination of the long-standing and effective Code arrangement. The proposed revision will have significant negative impact on both the NEC and the communications industry as follows:
1. Presently, none of the requirements in Chapters 1 through 7 apply to Chapter 8 unless they are specifically referenced in Chapter 8. The proposed revision of 90.3 will require that all Chapter 8 articles be reviewed and revised to identify each requirement of Chapters 1 through 7 that does not apply.
2. Communications providers' installation and maintenance practices (best practices) are written based upon the present Code arrangement. The revision will require communications providers, as well as other standards bodies, to review and potentially revise their documentation at great expense to accommodate this unnecessary proposed revision.
3. There are many technical requirements that must be addressed. Examples include:
- In power circuits a conductor with green colored insulation identifies a grounding conductor; communications signal-carrying (ungrounded) conductors frequently use green colored insulation.
- If the Chapter 3 wiring requirements were applied to communications installations all of them would fail because of the integrated grounding scheme used where the battery return is connected to the equipment frame. Thus, some return current goes back to the source via the equipment grounding conductors.

802.3 WG position on FR8757

FR8757 – We understand the ER on CMP1 opposed this FR and we recommend that he continues to oppose. We request that IEEE-SA take a position of reject of the FR and offer the following statement for inclusion in the statement of rejection:

This is a technical change with no technical justification. The IEEE is opposed to this FR because of implementation problems inadvertently introduced by this FR. This FR would require that all exceptions granted by the standalone nature of Chapter 8 would need discovered and dispersed throughout the document. This is a tremendous amount of work that hasn't been scoped. The PI that led to this FR states: "The task group wishes to revise 90.3 as proposed based upon our ability to ensure there is no negative impact on the telecommunications industry." Where is the evidence that the TG has the ability to ensure there are no negative impacts on the telecommunications industry? In order to achieve 'no negative impacts', many additional PIs would need submitted and approved. No such PIs have appeared. Additionally, there were no incidents presented to show the necessity of such a wide-sweeping change, and there has been no substantiation provided.

PSCC WLS position on FR8757

Regarding another important matter now at hand in the 2020 Code development, I would like to ask SCC18 support in opposing an attempted elimination of the independence of Chapter 8. A review of FR 8757 (CMP-1) for 90.3 reveals that the requested change would effectively eliminate the independence of NFPA 70 Chapter 8. In our assessment as a user group, and also from my perspective as a Principal Engineer in AT&T Network Operations, eliminating the independence of Chapter 8 would cause significant harm to the communications industry by adding confusion and increasing operating expense. I offer the following details in support of this position:
The current and long-standing organization of the NEC groups requirements for the installation of wiring and equipment for communications (with its lower energy, inherently safer voltage/current levels, and well-established governing industry standards that help insure fire and shock safety) together in Chapter 8, with few and specific references to items in other chapters. The current organizational structure and Chapter 8 independence allows installers and inspectors of communications installations to reference this Chapter without confusion and doubt about applicable requirements. The proposed change would cause confusion, because all of the Code would then apply by default, so several exceptions would be required throughout the Code for requirements that are inappropriate for the installation of communications systems, thereby creating a significantly more complicated Code and greatly increasing the probability of mis-application. Such result is the opposite of the stated purpose of the PI (2818) that generated FR 8757 as I understand it.
Further, the resulting (unnecessary) changes to installation requirements would cause additional and unnecessary cost due to required retraining for thousands of technicians/installers, increased installation labor, and revisions of both internal practices

and industry standards to harmonize with changed installation requirements. Other unfortunate consequences (e.g. required changes to equipment design or incompatibility with equipment powering and grounding architectures) could also follow. These costly changes would unfortunately yield no increase in service quality or safety.
Overall, there are many reasons to preserve, and no identified reasons to eliminate, the independence of Chapter 8. Thus, we would appreciate opposition of FR-8757 or any other threat to the independence of Chapter 8.

CMP-3 Actions:

SCC18 Chair Comments: SCC18 committee members spent considerable time and effort exploring options in an attempt to satisfy the input from both the 802.3 WG and the PSCC WLS on certain CMP-3 First Revisions. After significant discussion in the full SCC18 committee meeting, a task group was formed to discuss the subject over lunch on the first day of the meeting. The TG members agreed to recommend abstention, and to include both the ERs comments (which are in agreement with the PSCC WLS position) and an additional request for the NEC Correlating Committee to form a new task group to further consider the use of the terms "nominal" and "rated." There was a clear consensus within the task group, but the decision was not unanimous. Since no viable solution was identified (either in full committee or task group discussions) that could resolve the identified conflicting positions between the IEEE committees that submitted input, SCC18 agreed to abstain on FRs 8790, 8859 and 8932 with accompanying statements as recommended by the TG.

I've divided the following information into two groups: group 1 contains the FRs with conflicting positions and group 2 contains the FRs where specific action was recommended and no conflict exists. All FRs not specifically mentioned were voted affirmative without comment, and there was no identified conflict.

Group 1: FRs 8790, 8859 and 8932

<u>SCC18 position on FRs 8790, 8859 and 8932</u>

Abstain on FRs 8790, 8859 and 8932 with the following statements:
The more appropriate term should be "Rated Current". Typically, in electrical systems, we refer to Nominal Voltage generally as the reference where the voltage may vary over a range, such as in 120 VAC systems where the voltage may vary 5 to 10 volts either side. These systems generally refer to current as a maximum and conductors are rated to carry that maximum current per the applicable sections of the Code and that rating is ampacity.
My understanding is that in today's telecommunications world the power draw is constant, which means that the current fluctuates inversely to the voltage (PoE 60 watt devices for example). Most telecommunications transmission equipment will stop operating when the system voltage drops below 44 Vdc, so if this type of discharge does occur, the current could exceed the conductor current rating (ampacity).
Now put yourself in the position of an AHJ inspecting these systems. How do they determine if an installation has been installed per the NEC? The only way is for them to refer to the manufacturer's name plate for the equipment which would provide a rated current value. This value is the maximum current at which the equipment will operate. Installation contractors have expressed concern for fear of liability issues because they can't guarantee their work based on an apparently arbitrary number "as specified by equipment design".
The term "rated current" is widely used and accepted in the industry.

I recommend that the Panel members really look at this during the interim between now and the Second Revision meeting to make sure they are fully cognizant of the potential ramifications of "defining" a term that cannot be quantified or inspected.
Furthermore, IEEE recommends that the NFPA Correlating Committee address this matter by assembling a task group made up of participants from CMP-03 and CMP-16, as well as interested industry experts, to develop Code language that provides the guidance necessary for installers and AHJs to properly apply the current limits identified in 725.144.

PSCC WLS position on FRs 8790, 8859 and 8932

Also, relevant to evolving technologies using communications power over communications conductors (e.g. Articles 840 and 725), WLS supports the use of rated current vs. nominal current, as it is referenced elsewhere in the Code and is appropriate for the intended application of the Code (verifiable safety without undue burden on the inspector).

802.3 WG positions on FRs 8790, 8859 and 8932

FR 8790 – We request that IEEE-SA take a position in support of the FR. The 802.3WG supports the term nominal current and feels strongly that rated current would be the incorrect term. See our proposed statement for FR 7892 for further detail. We therefore request either a statement in favor of nominal current or a removal of the ER's proposed statement of support for the term rated current.

FR 8859 – We request that IEEE-SA take a position in support of the FR, specifically a vote of affirmative with a comment. The comment reads as follows: This FR only implements part of Issued TIA 17-11 (balloted as Log 1299). Specifically, it is missing the labelling exception for ports where nominal current is less than 0.3A. Nearly half a billion ports of these power sources have shipped over the past 15 years without any demonstrated record of loss. They provide less than 0.3 amperes nominal current per conductor. Updating the large variety, breadth and number of these types of power sources represents an undue burden on industry. Changing the labeling to align with the 'nominal current' specification of 725 removes this burden. We recommend reincorporating the exception in the Second Revision phase.

FR8932 – We request that IEEE-SA take a position in support of the FR.

Group 2: FRs 8779, 8934, and 8941

SCC18 position on FRs 8779, 8934 and 8941

Support FR 8779 with the following statement:
"Change the wording to include the word "more" before "signal crosstalk". This is to clarify the actual result of combing of the cables."

Support FR 8934 with no statement.

Support FR 8941 with the following statement:
"The FR has several typos and an awkward sentence structure that could lead to confusion. 'Requirements' is misspelled in Informational Note 2; 'The' and 'ampacity' is misspelled in Table 725.144 Informational Note 2. Table Informational Note has this reference: "see TIA-TSB-184-A and Sections 6.4.7 and 6.6.3 and Annex G of ANSI/TIA-568-C.2," Suggest changing to: "see TIA-TSB-184-A and ANSI/TIA-568-C.2, Sections 6.4.7, 6.6.3, and Annex G,""

802.3 WG positions on FRs 8779, 8934 and 8941

FR 8779 – We request that IEEE-SA take a position in support of the FR. The FR has a grammatical error that implies combed bundles would have less crosstalk ("Combing of the cables can result in less heat dissipation and signal crosstalk between cables"). We suggest a vote of affirmative with a comment: "change to: Combing of the cables can result in less heat dissipation and more signal crosstalk between cables."

FR8934 – We request that IEEE-SA take a position in support of the FR.

FR8941 – We request that IEEE-SA take a position in support of the FR, specifically a vote of affirmative with a comment. The comment reads as follows: The FR has several typos and an awkward sentence structure that could lead to confusion. 'Requirements' is misspelled in Informational Note 2; 'The' and 'ampacity' is misspelled in Table 725.144 Informational Note 2. Table Informational Note has this reference: "see TIA-TSB-184-A and Sections 6.4.7 and 6.6.3 and Annex G of ANSI/TIA-568-C.2," Suggest changing to: "see TIA-TSB-184-A and ANSI/TIA-568-C.2, Sections 6.4.7, 6.6.3, and Annex G,".

PSCC WLS positions on FRs 8779, 8934 and 8941

No specific position identified.

CMP-16 Actions:

SCC18 Chair Comments: The positions of SCC18, the 802.3 WG, and the PSSC WLS are in agreement on all CMP-16 FRs with the exception of one item. The recommendations of the PSCC WLS and the 802.3 WG were in direct conflict on one subject, FR 7892. The PSCC WLS supported the FR and specifically the use of the word "rated." The 802.3 WG opposed the FR because of the use of the word "rated," along with a comment regarding certain style and grammar issues with a sentence in the informational note. SCC18 discussed this issue at length, and took what is intended to be a compromise position.

SCC18 position on FR 7892

Support FR 7892 with the following statement:
"The word "rated" should be deleted from the exception."

PSCC WLS position on FR 7892

The Wire-Line Subcommittee of P.E.S. Power System Communications & Cybersecurity, PSCC SC6 (WLS) has reviewed Bill McCoy's CMP-16 report from the January meetings and supports the Panel 16 proposed changes (Draft First Revisions) with no concerns of note.

Also, relevant to evolving technologies using communications power over communications conductors (e.g. Articles 840 and 725), WLS supports the use of rated current vs. nominal current, as it is referenced elsewhere in the Code and is appropriate for the intended application of the Code (verifiable safety without undue burden on the inspector).

802.3 WG position on FR 7892

FR7892 – We request that IEEE-SA take a position of reject of the FR with the following statement of rejection:

There are three reasons for rejection:

First: CMP16 changed the term 'nominal' to rated. The term 'nominal' was chosen specifically because it did not have existing meaning in the NEC or UL standards. The term rated has an existing meaning in UL standards which can be interpreted to limit the current variation to 10%, which is less than what is observed in PoE systems. It also does not include the pair-to-pair balancing that was implied with the term nominal. Further, it is worth noting that on a parallel comment CMP3 retained the term 'nominal.'

Second: the last sentence of the new informational note is incorrect and not consistent with

NEC style ("A large number of such powering cables bundled together can cause overheating of the wiring if not controlled as described in Table 725.144."). This sentence points out one way that one can cause problems if they don't follow the code. It is not customary in the rest of the code to list the ramifications of not following the code.
Additionally, the proper reference is not Table 725.144 but the whole of 725.144. There are many ways to mitigate the bundle heating in 725.144 and the Table is but one of them.

Third: there was a TIA (Issued TIA 17-12 balloted as Log 1301) that was created by a multi-panel Task Group, chartered by the NFPA Standards Council and the NEC Correlating Committee that resolved many issues. However, during the revision meetings, the text of the TIA was rewritten in this FR and introduced the problems cited above. The FR doesn't include the definition for 'nominal current' contained in the TIA. It's understood that the CMP replaced 'nominal' with 'rated'. No definition of rated current is provided. The use of rated current in this FR is different than the parallel section in 725 where CMP3 specifically chose not to use rated. Using the text of TIA 17-12 will resolve these issues.

Additional input on CMP-16

802.3 WG positions on FRs 7856 and 7862

FR7856 – We request that IEEE-SA take a position in support of the FR. *(no conflict, requested action taken)*

FR7862 – We request that IEEE-SA take a position in support of the FR. *(no conflict, requested action taken)*