

## Expanded Capability Panelboards and NEC Compliance

### Class 2100

Retain for future use.

### Introduction

The natural expansion of panelboard capabilities has resulted from the electrical industry's constant aim to add value to its customers' installed, electrical equipment base. Panelboards have grown from simple assemblies of circuit breakers connected to a single bus stack, to arrangements that are flexible enough to meet the specific needs of various parts of the electrical system in a single product assembly. The codes and standards associated with panelboards have also been revised to adjust to the evolving needs of the industry, while maintaining requirements for product performance and safe installation. This document is intended to clarify the suitability of I-Line Combo Panelboards to be installed in compliance with the NFPA 70®, National Electric Code® (NEC).

### Third-Party Certification

Evaluation of panelboard certification is an important step in verifying that the installation requirements of NFPA 70: National Electrical Code (NEC) are met. In the 2011 edition of the NEC, Section 110.3(B) provides general guidance in the approval of electrical equipment.

#### **NFPA 70, NEC, 2011 Edition**

**110.3(B) Installation and Use.** *Listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling.*

Product Listing by a third-party certification agency provides assurance that the panelboard construction, enclosure, bases and supports, covers and barriers, current-carrying parts (bus), terminals, spacings, overcurrent protective devices, wiring space, grounding and bonding, and performance tests meet the requirements of the product safety standard, UL 67, Standard for Safety, Panelboards. The evaluation by the standard also includes verification that the product can be installed to comply with the NEC. The expansion of panelboard capabilities and arrangements increases the value of third-party certification in the approval of a panelboard by providing the technical expertise, equipment, and testing necessary to perform this evaluation.

### Installation Compliance— NEC Article 408

Article 408 of the 2011 edition of the NEC includes specific installation requirements for panelboards and switchboards. Section 408.36 of the article requires all panelboards to be protected by an overcurrent protective device.

**408.36 Overcurrent Protection.** *In addition to the requirement of 408.30, a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.*

The overcurrent protection requirement in section 408.36 is key to an NEC-compliant installation. For a panelboard, this overcurrent protection must not be greater than the marked rated current of the panelboard. This requirement aligns with the performance testing and marking requirements in the UL 67 product standard. It is important to remember that this requirement applies to the overall rating of the panelboard and that bus assemblies within may have reduced ampacity where marked. Requirements for supplemental ratings within the panelboard are evaluated as part of the product listing. Excerpts from the product standard, *UL 67, Standard for Safety, Panelboards*, and the *UL Marking and Application Guide, Panelboards* are shown below.

***UL 67, Standard for Panelboards, Twelfth Edition, revisions through January 11, 2013***

*29.1 The current rating of a panelboard shall not be more than the smaller of the following:*

- a) The ampacity of the bus bars; or*
- b) The current rating of the main switch and fuseholders, or the current rating - trip rating - of the main circuit breaker, except as noted in 32.8.6; or*
- c) For NEC Article 705 applications noted in 5.6.11:*
  - 1) Supply side connections - The combined sum of the current rating of all supply side disconnect(s) intended for connection to parallel power sources. See 32.16.6.*
  - 2) Load side connections - The combined sum of the current rating of all overcurrent devices supplying the panelboard.*

*Exception: The combined sum may exceed the rating of the bus bars, or the rating of the main overcurrent device by up to 120% if overcurrent device(s) are positioned as noted in 5.6.11(b), exception. See 32.16.5.*

*29.2 The current rating referred to in 29.1 is capable of being supplemented by one or more reduced ratings, each applicable under specified conditions - such as use of aluminum main conductors or a main circuit breaker having a current rating less than the rating normally required of the breaker - when the panelboard is marked in accordance with 32.1.16.*

*32.1.16 The conditions under which each supplementary current rating as mentioned in 29.2 applies shall be marked on the panelboard.*

***UL Whitebook—UL Marking and Application Guide, Panelboards, January 2013***

***7. CURRENT RATING***

*The current rating of a panelboard is the maximum continuous current that can be supplied through the main terminals. Unless the assembly, including the overcurrent device(s), are marked for use at 100 percent of their current rating, overcurrent protection devices should not be loaded continuously to more than 80 percent of their rating if nuisance opening of the overcurrent device is to be avoided. The current rating of a panelboard may be supplemented by one or more reduced ratings, each applicable under specified conditions.*

## Expanded Capability Panelboard Example

Although I-Line Combo panelboards are different in appearance as compared to traditional panelboards, compliance with the NEC is straight forward where third-party certified product is installed per the product marking and manufacturer's instructions. The example below illustrates how a panelboard with expanded capabilities would be marked to comply with the UL 67 product standard, the NEC, and third-party certification.

Figure 1: Section Rating Marking Location

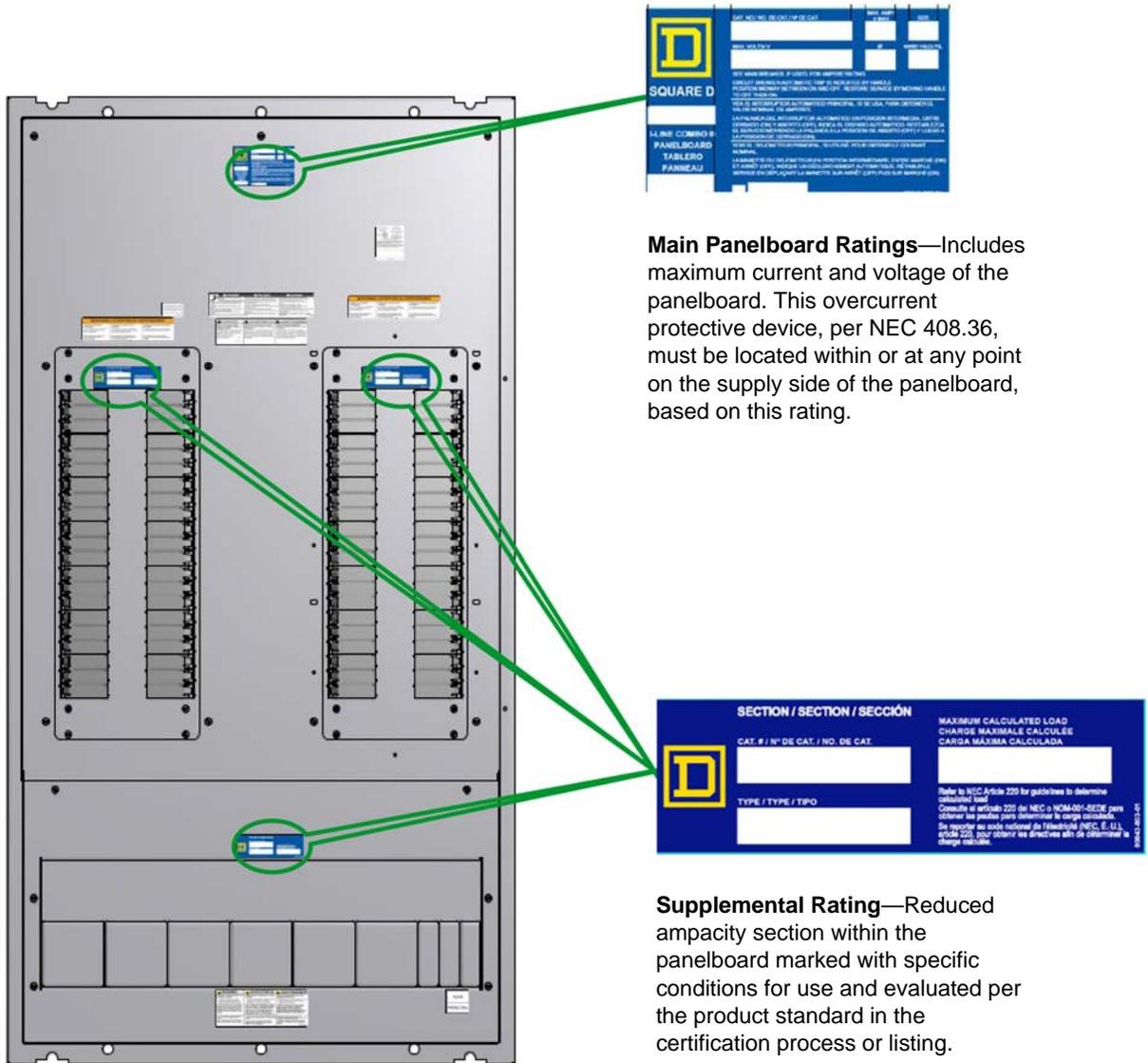
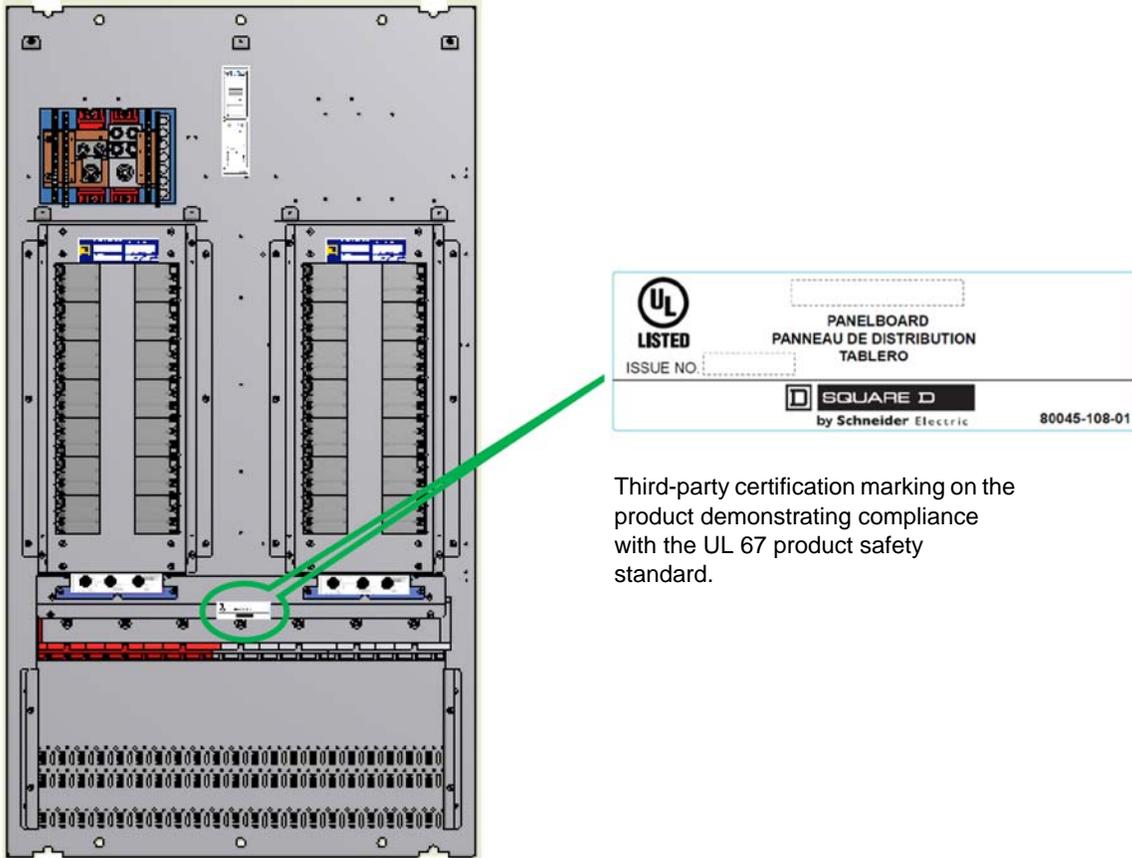


Figure 2: Certification Mark Location



Third-party certification marking on the product demonstrating compliance with the UL 67 product safety standard.

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