

NQ Panelboards—Quality and Durability Testing

Class 1640

Retain for future use.

A Reputation for Quality and Durability

With a reputation for quality and durability, Square D™ brand lighting and power panelboards are the preferred choice of electrical consultants, contractors, and end users. This reputation has helped Schneider Electric develop a broad base of loyal customers that install and use Square D brand panelboards daily, in various applications.

Extensive Testing Regimen for the NQ Panelboard

When a product is developed, Schneider Electric makes a significant capital investment to ensure it complies with all relevant industry standards. The testing regimen used for the NQ panelboard continues to meet and exceed these rigorous standards. The NQ panelboard is designed and tested to comply with the following industry standards:

- Underwriters Laboratories® (UL®)
 - UL 50
 - UL 50E
 - UL 67
 - UL 98
 - UL 746C
 - UL 489
- National Electrical Manufacturers Association® (NEMA®)
 - NEMA AB1
 - NEMA KS1
 - NEMA PB1
 - NEMA 250
- Canadian Standards Association® (CSA®)
 - CSA C22.2 No. 4
 - CSA C22.2 No. 5
 - CSA C22.2 No. 29
 - CSA C22.2 No. 94
- National Electrical Code® (NEC®)
 - NFPA 70
- International Building Code® (IBC®)
- American Society of Civil Engineers® (ASCE®)
 - ASCE 7

Additionally, Schneider Electric designs and tests the NQ panelboard above and beyond required industry standards.

- Shipping and packaging testing
- Panelboard interior endurance testing
 - Adapted from UL 857 standard
- Field installation testing with electrical contractors
- Bonding resistance testing
- Thermal cycle testing
- Seismic qualification testing

Overview of UL Panelboard Testing Procedures

A new panelboard undergoes many hours of design, development, and testing before it is submitted to industry standards organizations for compliance approval. Once submitted for review, certifying authorities, such as UL, perform comprehensive and rigorous certification tests to confirm a panelboard complies with their standards.

The following is a list of UL mandated certification tests, passed by the NQ panelboard.

Temperature Testing

As specified in the **UL 67** and **CSA C22.2 No. 29** standards, a panelboard must not exceed a maximum temperature rise of 65°C (149°F) above a 10–40°C (50–104°F) ambient temperature when operated at a maximum rated amperage for approximately four hours, or until the thermals stabilize and readings are documented.

During the NQ panelboard development process, Schneider Electric conducted numerous thermal tests, at various amperages, and performed three UL supervised thermal tests. These tests proved successful.

Rain Testing

Schneider Electric used the demanding water ingress standard, **UL 50E**, to confirm the performance of the weatherproof NQ panelboard enclosure.

Strength of Insulating and Base Support Testing

When testing per standard **UL 67**, Schneider Electric torqued a short length of conductor to 110% of the torque value marked on the NQ panelboard label. For compliance, UL requires this procedure cause no considerable damage to the panelboard molded components.

The NQ panelboard passed this test with no damage noted.

Mold Stress Relief Distortion Testing

Schneider Electric performed the mold stress relief distortion test prescribed by UL by placing an NQ interior in a full-draft circulating air oven heated to at least 70°C (158°F) for seven hours and then allowed to be cooled to room temperature.

NQ panelboards earned compliance with standard **UL 746C** by passing the test with no softening, shrinkage, warpage, or other distortion noted.

Short Circuit Current Testing

As specified in standards **UL 67** and **CSA 22.2 No. 29**, a series of 3-cycle short circuit withstand and maximum voltage tests were conducted to confirm that the panelboard could withstand the fault current ratings claimed without substantial damage.

During the NQ panelboard development process, Schneider Electric conducted numerous short circuit tests, at various AIC levels, and performed seven UL supervised tests. These tests proved successful:

- At 100–225 A, 3-cycle test resulted in a 10 kA rating
- At 400–600 A, 3-cycle test resulted in a 25 kA rating

The successful results of this testing enabled Schneider Electric to produce NQ panelboards for sale and to mark them with the cULus label.

Overview of Additional Schneider Electric Panelboard Testing Procedures

All panelboards bearing a cULus label undergo the same rigorous UL certification testing. However, Schneider Electric took additional steps and performed additional testing to improve the NQ panelboard and confirm that it would meet and exceed UL, CSA, and customer quality and durability expectations.

The following is a summary of the other tests Schneider Electric conducted to ensure the NQ panelboard achieved the highest levels of quality and durability.

Shipping and Packaging Testing

Schneider Electric performed a number of shipping-related tests, focused primarily on receiving an installation of the NQ panelboard, to confirm the quality of its packaging. The panel was subjected to rotational vibration tests (up to 14,200 vibratory impacts) to ensure the integrity of the panelboard, particularly its blank filler plates, was not compromised during shipping.

This testing resulted in improvements to the shipping cartons and internal packaging used. These improvements have eliminated/reduced shipping damage.

Panelboard Interior Endurance Testing

Branch circuit breakers in the NQ panelboard can be attached to the mounting rail and/or the plug-in branch connectors. Schneider Electric redesigned these components for the NQ panelboard. The plug-in branch connectors for 100 and 225 A NQ panelboard interiors were upgraded to have 30% more cross-sectional area and a 225 A current rating.

To test the new components for durability per standard **UL 857** (Plug-in Units for Busway) Schneider Electric installed and removed the 200 A three-pole QO-VH plug-in circuit breaker twenty-five times at each of the various mounting locations on a 225 A NQ panelboard interior. This circuit breaker is the largest, highest amperage circuit breaker that can be installed in the panelboard and the worst case for potential panelboard damage from repeated branch circuit breaker installation and removal. The testing revealed no damage to either the mounting rail or the plug-in branch connectors.

Field Installation Testing with Electrical Contractors

Schneider Electric tasked fifteen electricians in five U.S. and three Canadian locations with evaluating the NQ panelboard and its installation instructions. These evaluations were also used to confirm the ease of assembly/installation of various ready-to-install (RTI) accessory kits and branch circuit breakers.

Bonding Resistance Testing

Schneider Electric followed the requirements of standard **UL 67**, including testing to ensure a reliable bond exists between the NQ panelboard and its enclosure. This successful testing ensures proper bonding for service entrance applications.

Thermal-Cycle Testing

Schneider Electric subjected the NQ panelboard bus bars and branch connections to rigorous thermal-cycle testing to ensure a consistent torque is maintained in electrical joints with bolt-on and plug-on circuit breakers.

Seismic Qualification Testing

NQ Panelboards are tested according to the ICC-ES acceptance criteria "AC156: Acceptance Criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components" to meet the seismic provisions of the International Building Code (IBC) and ASCE/SEI 7. The panelboards meet an Importance Factor equal to 1.5, which demonstrates that the panelboards maintained their structural integrity during the shaking and were functional after the testing.

Conclusion

The NQ panelboard has been the most extensively tested and evaluated panelboard ever developed by Schneider Electric. These efforts help to ensure that the NQ panelboard delivers the quality and durability expected of products bearing the Square D brand name.