

The National Electric Code (NEC) and Newton Instrument Company Cable / Ladder Rack

Our customers' concerns:

Over the last 2-3 months there have been requests from several customers regarding Newton's interpretation of the 2002 edition of the National Electric Code (the rules that construction inspectors follow). Generally speaking, the code states that cable tray, cable rack, ladder rack, et cetera, can only be filled to 50% of the height of the side rails.

In earlier days, the inspectors only were interested in medium and high voltage applications. Typical medium voltage applications like lights, office receptacles, et cetera, would be 120 volts. Offices rarely exceed 600 volts which is the domain of industrial applications. Telephone companies were considered a "utility" and electrical inspectors did not regulate them. Besides, most of the cable are low voltage and were not of concern to the inspectors. Now, with deregulation, they look more and more at the wiring closets in office buildings, as well as what goes on in the CO.

From these statements, customers are questioning our grid, bar, channel, and tubular-type cable rack (as well as bends and drop-offs) which has between 0" and 0.188" side rail height.

What the code states:

Article 392.9(B) of the 2002 Edition of the National Electric Code regarding ladder cable rack and internal fill area states:

Multiconductor Control and/or Signal Cables Only

Where a ladder or ventilated trough cable tray having a usable inside depth of 150mm (6") or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray. A depth of 150mm (6") shall be used to compute the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150mm (6").

Articles 392.9(A.1), 392.9(A.2), and 392.9(A.3) also refer to ladder cable rack, but only with regards to layering and cross-sectional fill area when power and lighting cables are included with control and/or signal cables. These calculations are made using charts supplied in the NEC manual (**Table 392.9**).

Newton Instrument Company's position:

Cable rack and the like is designed for low voltage communications and data cables. In its recommended installation, it has little or no side rail height, thus no depth as defined by the NEC. **It is the Newton Instrument Company position that because of the very limited heat generated in these cables and the unique application of communications cable, NEC Article 392.9(B) does not apply.** Mechanical retention of the cables is accomplished by lacing twine, cable ties, or Velcro strapping... none of which substantially reduces heat dissipation. Other requirements and details are as follows:

- If power cables are part of the system, they must be segregated from the voice and data cable utilizing separate cable support systems, cable brackets, or approved dividers.
- If an inspector rules that there must be a side retainer (rail), cable retaining posts can be added to meet the requirement. This could also be done to retrofit existing installations, if so required by a local inspector.
- If cable rack is installed upside down, creating a "depth", it would be almost impossible to exceed the 50% rule because of the calculation of the cross-sectional area of the cable. When used in this upside-down application, rectangular cross-members (rungs) should be used or pans should be used on top of channel style rungs.
- Ultimately, the final decision regarding the application and conformity of communication and data cable wiring to **NEC Article 392.9** lies in the local electrical inspector.

This is strictly Newton Instrument Company's position and does not supercede the authority of the local electrical inspector's interpretation of the National Electric Code.