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PERMISSIBLE CONSTRUCTION TO USE TYPE NM CABLE

This article is an interpretation of the 2002 National Electrical Code®
regarding NM Cable. Please verify this information with all local inspection agencies.

By: David H. Kendall

Introduction

The 2002 National Electrical Code (NEC) is permitting the use of Nonmetallic Sheathed (NM) cables to be installed in buildings (structures) with heights higher than three stories. The intent of this article is to better understand the height limit of these buildings based on the language found in Section 334.10 of the NEC.

The use of Type Nonmetallic Sheathed (NM) cable is regulated by both building and electrical codes for most occupancies. Codes and standards that address specific hazards may also regulate cable types and cabling methods in areas where those hazards exist.

The majority of jurisdictions in the United States use a version of the National Electrical Code (NEC). The most current edition is the 2002. Many jurisdictions are using older editions, typically either the 1996 or the 1999 edition. The International Code Council-Electrical Code (ICC-EC), first published in 2000, adopts the NEC 1999 edition with amendments. To further complicate the situation, it is not unusual for local jurisdictions to amend the electrical code or the building code as part of the adoption process.

Code Being Used

In order to determine if Type NM cable may be used, the applicable building and/or electrical codes and edition must be identified. Typically a call to the local Building Official or Plans Review Office will yield the needed information. Be sure to not only ask, what version of the electrical code is enforced, but ask if local amendments have been adopted. Local amendments may revise either the building and/or the electrical code. The amendments can make either code more or less restrictive.

Building codes do not directly regulate cabling types. The building code typically will reference the electrical code. The building codes may indirectly regulate cabling types. Example: Some of the electrical codes provisions limit cabling type based upon construction type. The building code limits construction type based on occupancy, building height and building area. Effectively the building code requirements, in that case, limit the wiring type.

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Tables

Table 1 summarizes the code requirements of the NEC (1996 and 1999 editions) and ICC-EC (2000 edition and 2001 and 2002 supplements) as well as the BOCA National Building Code (BNBC) and the ICC International Building Code (IBC) regulating the use of Type NM cable.

Table 2 lists the largest buildings that Type NM cable may be used based on the requirements of NEC 2002 edition and the construction type limits in the International Building Code (IBC). This table would be different if a different building code is used, or if a different edition of the IBC is used, or if local amendments alter the "heights and areas" table.

National Electrical Code – NEC (also know as NFPA 70)

Section 336-4 of NEC 1996 and 1999 edition allows Type NM cable to be used in any building 3 stories or less in height provided the building does not contain unusual hazards. Section 336-5 prohibits Type NM cable in any building of four or more stories.

Section 334.10 NEC 2002 allows Type NM cable in any building that can be built of combustible construction as defined by the building code. Combustible construction is described in most building codes as Type III, IV, or V construction. Construction type is limited by three factors: building height, floor area, and type of occupancy. Buildings built of noncombustible construction (Types I and II) may use Type NM cable if the building code will allow the building to be built of combustible construction. Example: A 4-story apartment building (R-2) with a floor plate of 15000ft^2 built of Type 2 construction may use Type NM Cable, since the building could have been built of Type III, IV, or V construction.

If the building is protected throughout by an approved automatic sprinkler system, Section 504.2 IBC allows the height limits in Table 2 to be increased by 20 feet and one story. Section 506 IBC also allows the area to increases up to 350% of the table limits, if open perimeter and sprinkler requirements are followed. See the IBC for several area modification factors.

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	Const Type	Stories	NEC 1996	Section	NEC 1999	Section	ICC-EC 2000	Section	ICC-EC 2001 Supplement	Section	ICC-EC 2002 Supplement	Section	BOCA-BNBC 1996	BOCA-BNBC 1999	ICC-IBC 2000
Any Occupancy [1, 2, 3]	Any	3 or less	**P**	336-4	**P**	336-4	**P**	336-4	**P**	1201.2	**P**	1202.2	No limit by BNBC. Must check referenced Electrical Code.		No limit by IBC. Must check referenced Electrical Code.
	Any	4	**NP**	336-5	**NP**	336-5	**NP**	336-5	**P**[4]	1201.2	**P**	1202.2			
	Any	More than 4	**NP**	336-5	**NP**	336-5	**NP**	336-5	**NP**	1201.2	**P**	1202.2			

TABLE 1

General Notes

N.P. – Not Permitted

P – Permitted

Type NM cable may be installed exposed (Section 334.10 of the 2002 NEC, Section 336-4 of the 1996 and 1999 NEC)

[1] One- or two-family dwellings of any height may use Type NM (Section 336-4)
[2] Not including specific locations such as flammable or combustible liquids storage areas or wet locations etc.
[3] For Assembly and Institutional facilities refer to the code
[4] Apartment (R-2) buildings only

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TABLE 2

MAXIMUM STORIES AND AREAS

Based on **NEC** – 2002 and **IBC** – 2000

LOCATION		TYPE OF CONSTRUCTION							
		TYPE I	**TYPE II**		**TYPE III**		**TYPE IV**	**TYPE V**	
		A	A	B	A	B	HT	A	B
Height limitations (ft)		65	65	55	65	55	65	50	40
GROUP	EXAMPLE	PERMITTED MAX STORIES AND MAX AREAS/FLOOR (ft_)							
B	Offices	5 36,000	5 36,000	4 23,000	5 28,500	4 19,000	5 36,000	3 18,000	2 9,000
E	Schools	3 25,500	3 25,500	2 14,500	3 23,500	2 14,500	3 25,500	1 18,500	1 9,500
F-1	Moderate Hazard Factory Machine Shop	4 33,500	4 25,000	2 15,500	3 19,000	2 12,000	4 33,500	2 14,000	1 8,500
F-2	Low Hazard Factory Brick, Gypsum	5 50,500	5 37,500	4 28,500	4 28,500	3 18,000	5 50,500	3 21,000	2 13,000
M	Retail	4 20,500	4 20,500	4 12,500	4 18,500	4 12,500	4 20,500	3 14,000	1 9,000
R-1	Hotels	4 24,000	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
R-2	Apartments	4 24,000	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
R-3	Townhouses	4 UL	4 UL	4 UL	4 UL	4 UL	4 UL	3 UL	3 UL
R-4	Small Group Homes	4 24,000	4 24,000	4 16,000	4 24,000	4 16,000	4 20,500	3 12,000	2 7,000
S-1	Warehouse	3 26,000	3 26,000	3 17,500	3 26,000	3 17,500	4 25,500	3 14,000	1 9,000
S-2	Warehouse	4 39,000	4 39,000	4 26,000	4 39,000	4 26,000	5 38,500	4 21,000	2 13,500
U	Barns, Out Buildings	4 18,000	4 14,000	2 8,500	3 14,000	2 8,500	4 18,000	2 9,000	1 5,500

General Notes:
This table is based on Section 334.10 of NEC 2002 edition and IBC Table 503 2000 edition.
Buildings that are under the limits in this table may use Type NM Cable (Section 334.10)
Area limits are per floor.
Height limits may be increased by one-story when protected by automatic sprinklers.
Area limits may be increased up to 350% of the table values if open perimeter and automatic sprinkler requirements are met.
One- and two-family dwellings may use Type NM Cable (Section 334.10).

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International Code Council Electrical Code (ICC-EC)

The ICC-EC 2000 edition adopts the NEC 1999 edition without modifying the previsions relating to Type NM cable. Type NM cable may be used in any building 3 stories or less in height provided the building does not contain unusual hazards. Type NM cable may not be used in any building of four or more stories.

Section 1201.2 of the ICC-EC 2001 supplement modifies the NEC 1999 provisions to allow Type NM cable in 4-story apartment buildings. The supplement allows: Type NM cable in all buildings 3 stories or less, prohibits Type NM cable in buildings of 4 or more stories. Except it allows 4 -story apartment buildings to use Type NM cable.

Section 1202.2 of the ICC-EC 2002 supplement modifies the NEC 1999 provisions to allow Type NM cable in any building of any construction type and any height except for hazardous areas. While the ICC-EC 2002 supplement does allow Type NM cable, the ICC-EC 2002 supplement has not been adopted in many locations. The final rule making action was not completed until late 2001. It will take sometime for it to be adopted. Local jurisdictions may adopt the supplement and locally amend the provision allowing Type NM cable.

Summary

This document shows the interrelation in the regulation of Type NM cable between the electrical and building codes. The use of Type NM cable while directly regulated by the electrical codes is affected by the building code.

The latest revision cycles have increased the locations that Type NM cable may be used. Not all localities have adopted the newer versions of the codes. Over the next several years these latest revisions will come into wide spread use.

Special Note

It should be noted that assembly occupancies (such as theaters) and institutional occupancies (such as hospitals) are not included in any of this discussion since the NEC has special requirements for these occupancies.

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