2017 NCDOI Code College
Electrical Series

Manufactured Buildings
And
The Electrical Code

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Manufactured Homes
Modular Homes and Buildings
Definitions

Manufactured Home (formerly Mobile Home):

A manufactured building designed to be used as a single family dwelling unit which has been constructed and labeled indicating compliance with the HUD administered National Manufactured Housing Construction and Safety Act of 1974.
Definitions

Mobile Home

A manufactured building designed to be used as a single family dwelling unit which was built prior to the HUD administered National Manufactured Housing Construction and Safety Act of 1974.
Definitions

Modular Building:

A manufactured building constructed in accordance with the North Carolina State Building Code in effect at the time of construction.
Modular vs. Manufactured Housing

- Modular Homes and Buildings are built to the NC State Building Codes and are used for single family, multifamily, and commercial applications.

- Modular homes and buildings must meet all the electrical requirements of comparable site built structures.
Modular Homes (Residential)

Built in a Factory in accordance with the NC State Residential Codes

Administered by NC Building Code Council
Modular Buildings
(Commercial)

Built in a Factory in accordance with the NC State Building Codes

Administered by NC Building Code Council
NORTH CAROLINA
STATE BUILDING CODE

VOLUME VIII - MODULAR CONSTRUCTION REGULATIONS

1994 Edition
Adopted June 9, 1992
by the North Carolina State
Building Code Council
in Accordance with Act of the
General Assembly of 1957
Chapter 1138

Published by
THE NORTH CAROLINA STATE BUILDING CODE COUNCIL

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THE NORTH CAROLINA DEPARTMENT OF INSURANCE
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Modular Buildings
Built in a Factory
under the
NC State
Modular
Construction
Program

Administered by
NC Building Code Council
Modular vs. Manufactured Housing

- Manufactured Housing is built to the HUD Federal Code and may be used only for single family housing.

- Manufactured Housing must meet the electrical requirements of the HUD Part 3280 Manufactured Home Construction and Safety Standards.
Manufacured Homes
Homes Built in Accordance with the Federal Building Code

24 CFR Part 3280
Manufactured Home Construction and Safety Standards

HUD CODE

www.ecfr.gov
North Carolina Regulations for Manufactured Housing 2004 Edition

Approved by Commissioner of Insurance

Enforcement Mandatory
Can you identify the following?

Manufactured Home?
Modular Building?
WHAT IS THIS?
WHAT IS THIS?
Modular Classroom Building
Modular Home - 2 Sections
WHAT IS THIS?
WHAT IS THIS?
Manufactured Home - 2 Sections
WHAT IS THIS?
Modular Home – 3 Sections
WHAT IS THIS?
Manufactured Home - 3 Sections
WHAT IS THIS?
Manufactured Home – 4 Sections/2 Stories
Manufactured Home ?
Modular Home ?

Cannot Identify a Home by Whether or Not It Has a Steel Frame

• Look at the Data Plate
• Look at the Labels
Data Plates

- **All** Factory Built Homes Have (or had) One

- **Contain the Most Information**
  - Manufacturer Name & Address
  - Units Serial Number and Model Number
  - Code or Standard Certification
  - Design Information
  - Installed Equipment Information
  - Special Instructions

- **Usual Locations:**
  - Glued to Kitchen Cabinet Door
  - Glued to Wall in Back of Closet
  - Electrical Panel Box
  - Glued to Wall Directly Beneath Kitchen Sink
  - Glued to Wall in the Back of a Kitchen Cabinet
Manufactured Homes HUD Data Plate (found inside home)

Shows US Maps:
- Wind Zones
- Roof Live Loads
- Thermal Zones
Modular Home Data Plate
(found inside home)

- Contains Same Typical Data
- Found at Same Typical Locations
- Does Not Have Any Maps
Labels

- All Factory Built Homes Have or Had One at One Time

- Manufactured Homes
  - HUD Label
    - One Label Per Floor Section
    - Located Outside – End Opposite Hitch
HUD Label for Manufactured Homes

- One Label Per Floor Section
- **Outside** Home OPPOSITE END from the Hitch
- First Three Letters Indicate Inspection Agency
Labels (con’t)

- Modular Homes and Buildings
  - Modular Construction Validation Stamp
    - One Stamp per Residential Home
    - Usually near the Data Plate
    - One Stamp per box in Commercial Buildings
Modular Label

- MODULAR HAS A "VALIDATION STAMP" WITH A **RED** N.C. STATE SEAL ON A REFLECTIVE **SILVER** BACKGROUND, SIZE APPROX. 2.5” X 2.5”.

![Example of Modular Label](image.png)
Used Before February 1, 1986
Note: Used on Mobile & Modular

Old Styles of Modular Labels
Old Styles of Modular Labels

Used From 2009
Until Early 2017
Current Modular Label

(found inside home near Data Plate)
Prior to receiving a HUD or Modular label or a Data Plate, **All** factory built buildings **Must** be inspected for Code compliance by a certified inspector from an approved 3\textsuperscript{rd} party inspection agency.
Manufactured Building Division Information

Can be found on our website:

WWW.NCDOI.COM/OSFM/MANUFACTURED_BUILDING
Any Questions?
Electrical Installation Requirements
Electrical installations are covered under Subpart I of the HUD 24 CFR part 3280. and...
Manufactured Homes

...Article 550 of the 2005 National Electric Code.
Note: Per 3280.801 (b); Wherever the requirements of this book differ from the NEC the requirements in this book shall apply.
The current Electrical Code in effect for Modular Buildings is the 2014 North Carolina Electrical Code
Modular Homes

Homes Built in a Factory with electrical installation in Accordance with the 2014 NC Electrical Code

Homes Inspected in Plant by State Approved Third Party Certification Agencies
What are the major differences in the electrical code between Modular Homes and Manufactured Housing?
Arc-Fault Circuit-Interrupter Protection

Modular Homes: Required
Per NEC 210.12 (b)

Manufactured Homes: Not Required
Per 3280.801 (b)

Note: If arc-fault breakers are provided, they must be accordance with the 2005 NEC.
Aluminum Wire in Branch Circuits

Modular Homes: Permitted
per NEC 310.106 (b)

Manufactured Homes: Not permitted
per 3280.801 (e)
Outdoor Receptacles Required

Modular Homes:  *At least two* (one in the front and one in the back) *are required* per NEC 210.52 (E) (1)

Manufactured Homes:  *Only one is required* per 3280.806 (D)(8)
Length of Free Conductors at Outlet Boxes

Modular Homes: At least 6” of free conductor is required.
per NEC 300.14

Manufactured Homes: Only 4” of free conductor is required.
per 3280.808 (j)
Wiring Methods and Materials

Modular Homes: Conform to the 2014 North Carolina Electrical Code

Manufactured Homes: Conform to the 2005 National Electric Code unless otherwise specifically permitted in the HUD Standard Part 3280 per 3280.808 (a)
The primary NEC article that relates to manufactured homes is...
Article 550
Mobile Homes and Manufactured Homes
Article 550 of the National Electric Code covers electrical installations of Mobile Homes, Manufactured Homes and Mobile Home Parks. But remember that...
Manufactured Homes

...Wherever the requirements of the NEC differ from the HUD Code (24 CFR Part 3280), the requirements in the HUD Code shall apply.
The most questioned section of Article 550 is...
Article 550.32
Service Equipment
Article 550.32 (A) Mobile Home Service Equipment

Mobile home service equipment shall be located adjacent to the mobile home and not mounted in or on the mobile home.
Article 550.32(A)

Electrical Service Pedestal for a Mobile Home Per Article 550.32(A)
Article 550.32 (A)

Electrical Service Pedestal for a Manufactured Home located in manufactured home park

Per Article 550.32(A)
Article 550.32 (B) Manufactured Home Service Equipment

Manufactured home service equipment shall be permitted to be installed in or on a manufactured home, provided that all of the seven listed conditions are met.

1. The manufacturer shall include in its written installation instructions information indicating that the home shall be secured in place by an anchoring system or installed on and secured to a permanent foundation.

2. The installation of the service shall comply with Part I through Part VII of Article 230.

3. Means shall be provided for the connection of a grounding electrode conductor to the service equipment and routing it outside the structure.

4. Bonding and grounding of the service shall be in accordance with Part I through Part V of Article 250.

5. The manufacturer shall include in its written installation instructions one method of grounding the service equipment at the installation site. The instructions shall clearly state that other methods of grounding are found in Article 250.

6. The minimum size grounding electrode conductor shall be specified in the instructions.

7. A red warning label shall be mounted on or adjacent to the service equipment. The label shall state the following:

   WARNING
   DO NOT PROVIDE ELECTRICAL POWER UNTIL THE GROUNDING ELECTRODE(S) IS INSTALLED AND CONNECTED (SEE INSTALLATION INSTRUCTIONS).
Article 550.32 (B)

Allows Manufactured home electrical service equipment to be installed in or on a manufactured home if seven conditions are met
Article 550.32(B)

Electrical Service Mounted on a Manufactured Home Per Article 550.32(B)
Article 550.32 (B)

Another example of a manufactured home with the electrical service mounted on it
Another important manufactured home related NEC Article is...
Article 552
Park Trailers
(aka Park Models)
Manufactured Homes

Electrical installations of Park Trailers also known as “Park Models” are covered under Article 552 of the 2014 National Electric Code...

ARTICLE 552
Park Trailers

I. General

552.1 Scope. The provisions of this article cover the electrical conductors and equipment installed within or on park trailers not covered fully under Articles 550 and 551.

552.2 Definition. (See Articles 100, 550, and 551 for additional definitions.)

Park Trailer. A unit that is built on a single chassis mounted on wheels and has a gross trailer area not exceeding 37 m² (400 ft²) in the set-up mode.

552.4 General Requirements. A park trailer as specified in 552.2 is intended for seasonal use. It is not intended as a permanent dwelling unit or for commercial uses such as banks, clinics, offices, or similar.

Voltage Systems in Conversion and Recreational Vehicles.
APPENDIX E

PARK MODEL RECREATIONAL VEHICLES

The positions of the NC Department of Insurance on the requirements for the labeling and set up of "Park Model" recreational vehicles as permanent dwelling units are outlined below. All references herein to the National Electrical Code (NEC) are to the 2002 Edition.

RECREATIONAL VEHICLES: (as defined in Article 552, NEC, NFPA 1192, and ANSI 119.5)

A vehicular-type unit primarily designed as temporary living quarters for recreational, camping, or travel use, which either has its own motive power or is mounted on or drawn by another vehicle. The basic units are travel trailer, camping trailer, truck camper, and motor home.

"PARK TRAILER" (Park Model) - (as defined by Article 552, NEC)

A unit that meets the following criteria: (1) Built on a single chassis mounted on wheels, and (2) Having a gross trailer area not exceeding 400 sq. ft. in the set-up mode.

"PARK MODEL" RECREATIONAL VEHICLE - (as defined by NC Department of Insurance)

A "park model" recreational vehicle is basically a very small manufactured (mobile) home. They are typically built in accordance with the construction requirements of the HUD Manufactured Housing Code but because of their limited size (400 sq. ft. or less of living space) they are not required to be labeled by the HUD manufacturing housing program. Since these park model type units are not under the jurisdiction of the HUD program, these units have typically not been built, labeled and sold as recreational vehicles.

CODE REQUIREMENTS:

The construction requirements for recreational vehicles used as temporary recreational dwellings are not regulated by the State of North Carolina. Therefore these units are not required to be labeled. However, the electrical supply system to these units is required to be inspected in accordance with Article 552 of the NEC. Since these units are defined to be temporary structures, it is not permissible to set them up as permanent dwelling units. Therefore it is our interpretation that they cannot have any permanent plumbing or structural connections. The power supply is installed in accordance with Section 552-43 of the 2002 NEC. Section 552-43(a) is given below.

(a) Feeder. The power supply to the park trailer shall be a feeder assembly consisting of not more than one 30-ampere or 50-ampere park trailer power-supply cord with an integrally molded or securely attached cap or a permanently installed feeder.

We will allow these units to be temporarily blocked up and anchored, but not remain classified as a temporary structure, the wheels and axle must remain on the unit at all times. We recommend that all recreational vehicles used for temporary recreational dwellings be set-up in accordance with the manufacturer's recommendations.

PERMANENT STRUCTURES:

Generally speaking, recreational vehicles cannot be accepted as a permanent dwelling structure. However, we will permit a "Park Model" type recreational vehicle to be set up as a permanent dwelling unit if it is labeled as either a manufactured (mobile) home in accordance with HUD's National Manufactured Housing Construction and Safety Standards Act of 1974 or as a modular home in accordance with the North Carolina Regulations for Modular Construction. Units labeled in accordance with the HUD regulations shall be set up in accordance with the State of North Carolina Regulations for Manufactured Homes. Units labeled as a North Carolina modular home shall be set up in accordance with the North Carolina Residential Code, current edition.
Manufactured Homes

...And ANSI A119.5
Park Model Recreational Vehicle Standard
2015 Edition
Park Trailer NEC Definition

Article 552.2 of the NEC defines a Park Trailer as "a unit that is built on a single chassis mounted on wheels and has a gross trailer area not exceeding 400 square feet in the set-up mode."
NCDOI defines a Park Model as a recreational vehicle typically built in accordance with the HUD Manufactured Housing Code, but because it contains 400 square feet or less of living space it is NOT required to be labeled by the HUD Manufactured Housing Program.
ANSI A119.5 defines a Park Model Recreational Vehicle as “a single living unit that is primarily designed and completed on a single chassis, mounted on wheels, to provide temporary living quarters for recreational, camping, or seasonal use.”
Park Model/Trailer Labeling

- Park Trailers are typically Labeled as Recreational Vehicles through the Recreational Park Trailer Industry Association with the RPTIA Label - though this is NOT Mandatory.
- Because Recreational Vehicles are NOT regulated in North Carolina.
Recreational Park Trailer Industry Association

- Industry Association
- Membership Voluntary
- Members Agree to Build Units in Accordance with ANSI A119.5 Standard
- Members Agree to Have A QC Program
- Members Agree to QC Program Monitored by Third Party Certification Agencies
  - Same Agencies as HUD and MOD
  - Monitored Quarterly
- Allowed to Label Units with RTPIA Label
Park Trailer Label – Voluntary Program
Park Model/Trailer Characteristics

- **DO NOT** meet the State Residential Code
- **Cannot** be accepted as a permanent residential dwelling unless it has either a HUD label or a NC Modular Label Stamp
- Otherwise can only be used for temporary or seasonal housing (typically up to 180 days)
Electrical supply is required to be inspected.

Permanent Plumbing or Mechanical connections are NOT allowed.

Power supply is installed in accordance with Section 552.43 of the NEC.
NEC Article 552.43 states that the power supply to a park trailer **SHALL** be:

- A feeder assembly consisting of not more than one listed **30-ampere** or **50-ampere** park trailer power-supply cord with an integrally molded or securely attached cap

- or a permanently installed feeder
Park Model/Trailer Setup

- Allowed to be temporarily blocked up and anchored
- Wheels and Axels must remain on unit at all times
- All recreational vehicles used as temporary dwellings should be set-up in accordance with the manufacturer’s recommendations.
Examples of Park Model Units
Other Types of Factory Constructed Buildings
Construction Trailers and Sales Offices

- What are the Differences?
- What are the Code Requirements?
Temporary Construction Buildings

Section 201.1 & Section 702
Section 201.1 – Temporary Construction Building – Any building or portion of a building used as a temporary field office for the coordination of a nearby construction project by the general contractor and/or subcontractors. No portion of a temporary construction building may be used as an accessory occupancy (such as a sales office) into which the general public would be allowed access.
702.1 – All Temporary Construction Buildings as defined in Section 201 are exempt from the requirements of the North Carolina State Building Code except as indicated in this section.

702.2 – Temporary Constructions Buildings shall be inspected in accordance with the following requirements:

1. The electrical supply system to the unit shall be inspected for compliance with the State Electrical Code.
Small Construction Projects
Individual Construction Buildings (Exempt)
Large Construction Projects
Large Construction Building Complexes (Exempt)
Sales Office for Complex Under Construction (Not Exempt)
Sales Offices

Classified as:
Business Occupancy

All Code requirements apply
Commercial Modular Buildings

- Code requirements are the same as for commercial site-built (stick-built) buildings
- Receive one NC Modular Validating Stamp per section
Examples of Commercial Modular Buildings
Drive-Thru Bank
ATM Building - Walk-Up
ATM Building – Drive-Thru
Classroom Building
Drive-Thru Doughnut Shop
Gas Station/Convenience Store/Car Wash
Cellular Tower Equipment Shelter Buildings
Security Guard Building
Modular Jail
Pharmaceutical Factory
Multi-Family Residential
Modular Marriott Hotel
Any Questions?
So now that
You’re an expert
On Manufactured and
Modular Homes
Check this out:
WHAT IS THIS?
Manufactured? Modular? Or Site-Built Home?
Manufactured? Modular? Or Site-Built Home?
2 Story - Site-Built Home
WHAT IS THIS?
Manufactured? Modular? Or Site-Built Home?
Modular Home
What Is This?
Extra Living Space
What Is This?
A Mobile Addition
What Is This?
Creative Housing!!!
The End