



NATIONAL MODULAR HOUSING COUNCIL

Builder's Guide to Modular Home Set-Up & Completion

This guide contains an overview of the modular home installation process, and builder responsibilities. This is only a guide, and we recommend you consult with your manufacturer on these items prior to delivery and installation as specifications and expectations will vary.



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TERRAIN PREPARATION BEFORE DELIVERY

It is the builder's task to prepare the site to receive the modular structure, to contract crane service and to provide an area from which the crane can work. The following is a list of requirements for establishing a proper site, but requirements may not be limited to the criteria noted. Difficult sites may require additional preparation. Consult with the manufacturer if any questions arise.

SITE PREPARATION

The site should be cleared of all obstructions (boulders, trees, power lines, etc.,) which may affect the ability of the tractor trailer/transporter or crane to have access to and maneuver around the foundation location.

A. Inspect the route of travel from the nearest town to the site. Minimum and maximum clearances to allow for transport of structure are:

1. Road width: 15'-0" min.
2. Overhead clearance: 14'-0" min.
3. Power line clearance: 15'-0" min.
4. Carrier axle clearance: 14" max.
5. Slope on access ways: 12" in 20' max.
6. Bridge weight limit: 15-ton min.
7. Approaches to exits, bridges and underpasses must be long and wide enough to accommodate a 75' tractor trailer/transporter.

Again, if there is any doubt about the adequacy of the site route, contact the manufacturer's transportation manager for assistance. Manufacturers will work with the builder and local traffic control officials to resolve any difficulties with travel requirements. The builders' cooperation is requested in routing the homes to final destination as a requirement of the permits.

NOTE: More heavily populated areas may require special traffic control allowances (such as staging areas, traffic officer control, and parking bans).

B. The site should have two 30' x 60' areas cleared for use by the crane and transporter with reasonable access to these areas from the road. The driveway should be level to avoid costly repairs to the home on delivery. Site should have two areas adjacent to one another with one area having its dimensions abutting the foundation wall. The area against the foundation supports the crane and should be reasonably level with undisturbed soil or well-compacted fill.

C. When the grade is in excess of an 18' run, a 5-ton crawler/dozer may be required to assist with the modular delivery. Discuss prior with your manufacturer.

D. Recommended entry-road minimum clearances required are as follows:

When paved road is over:

- 40' wide - use a minimum radius clearance of 6'
- 30'-40' wide - use a minimum radius clearance of 10'
- 24'-30' wide - use a minimum radius clearance of 20'
- <24' wide - use a minimum radius clearance of 30'

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Most manufacturers recommend that an on-site inspection by the crane contractor be made prior to the set. A modular home is not necessarily a heavy item to lift, however, its size and any site restrictions must be clearly understood by the crane contractor. The crane contractor should determine the size of the crane needed to do the job based on the site requirements. Be sure to consider grade and soil conditions expected on the day of the set. Decide on a location for the crane in relation to the modules during the setting operation. Inspect the area for low wires, tree limbs and other such obstructions that may cause problems on the day of the set. Decide what obstructions should be removed prior to delivery. Consult with your crane contractor on the equipment necessary (slings, spread bars, etc.) to set a modular and discuss who's responsibility it is to bring them to the set.

Careful planning and coordination of the crane and contractor will save unnecessary cost resulting from carrier, crane and set crew layovers due to delays while site obstructions are cleared.

ON-SITE ACCEPTANCE OF HOUSE DELIVERY

1. The builder or his/her authorized representative should meet the house and drivers upon delivery at the job site.
2. The house shipping papers are checked to assure the specifications ordered match all sections of the home delivered.
3. The builder or an authorized representative should inspect each home when it arrives at the site.
4. The builder may have to have payment in hand to pay the driver, after inspection and prior to detaching from module. Discuss payment schedule with your manufacturer.
5. It is recommended you arrange delivery of the modules a day or two prior to set if possible. This helps avoid delays on set day due to traffic and weather.

SITE ERECTION OVERVIEW

The following information has been developed to assist builders by providing an overview of the sequence of events and planning required to set a modular home. Proper planning is the key to assuring the customer that a home will be safe and secure over the lifetime of the building. Poor planning and lack of attention to detail can cause a reoccurrence of any number of problems for the homeowner and must be avoided. In addition, service costs to the builder and manufacturer can be avoided.

This overview is an outline which describes the site erection sequence. Here, we will discuss the minimum acceptable practices for site set up and connection. Again, consult with your manufacturer for answers to any questions you may have. This is only a guide, and each manufacturer will have their own specifications.

Site Preparation:

Before the modules arrive at the site, the builder must have the foundation prepared using the guidelines laid out in the typical drawings and in accordance with local codes. The sill plate must be installed and level to provide the bearing surface for the floor rails.

Arrival On-site:

Prior to removing the module from the carrier, the builder should check the home for any in-transit damage and document it.

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Setting The Module:

1. Lift points are located and holes are drilled in the rail within 1/2" from bottom of double rail for lifting cables. The only accepted method of set-up is by the use of a crane. Spreader bars and slings must be used to lift the modules with the slings going the whole way around the module. Lifting point shall be one fourth to one third of the length in from each end, when two slings are used, or 10' feet in from each end. If the length of the module exceeds 46 feet the use of three spreader bars is recommended.
2. All carrier bolts and clips are removed from the floor system. They hold the module on the carrier.
3. All shipping plastic is removed from the marriage wall side of module making sure no nails or bolts are projecting past the wall. Do not remove the sheathing between the modules if present.

Foundation Wall:

4. An energy seal should be installed by the factory around the perimeter of the marriage wall. To ensure an energy-efficient seal between the modules, a foam gasket may be used for this insulating process. Except for modules that are the first floor of two story units, the roof is lifted up using cables and hooks, avoiding splice locations of the ridge rail. Kneewalls are installed in their designed location.
5. The home may now be lifted onto the foundation. Cables are placed through the rail holes and up over the carrier. The cables are tied together to complete a loop or sling with the spreader bar. The use of a becket is recommended. Spreader bars will assure that the cables do not rub against the side of the building. If the cable comes in contact with the finish material, place blocking between the sheathing and cable to prevent damage while lifting.
6. A rope is attached to opposing outside corners to help guide the home to its proper location. Begin lifting the module, keeping the one outside corner slightly lower than the rest. Set this module down on the foundation (low corner first), and adjust the placement of the other outside corner to be even with the foundation. (For full basement sets be sure that lolly columns for the basement are centered at the floor rail with steel plates installed on top of the column.) Let the home down the rest of the way until the cable slacks, check the alignment at each corner, then disconnect the cables and pull them out through the rails.
7. The perimeter rail is nailed to the sill plate with 16d nails @ 12" O.C. (For basement sets all lolly columns are located per the recommended schedule and lagged to marriage wall floor rails/girders with four 3/4" x 4" lags each one preferably into each rail. Additional columns are required under each side of marriage wall opening in excess of 52".)
8. The empty carrier is moved away from the staging area and the next module is brought into place.
9. Follow the same procedure on this module as was followed on the first.

Setting of Second Module:

10. Come-alongs are attached between the first module and second module to help draw them tight. The second module is drawn to the first one while the cables have a slight tension on them. The come-along is used to pull the modules as close as possible. Cable tension is released and the modules are allowed to come to total rest keeping the come-alongs tight. Usually a 5/8" gap will remain between the units. This is normal.

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11. Foundation alignment is then checked and adjusted as necessary.
12. The second module is nailed and the units are then bolted together, using 1/2" through-bolts.
13. The come-alongs are removed from floor area and the rails are lagged to the lolly columns.
14. The roof system is then finished or closed, per the appropriate drawings.
15. Shingles are applied as required to complete the roof. If applicable, the overhang is flipped down and fastened to the truss top chord and wall studs.
16. If the home is a two story, the rails of the first floor are bolted together with 1/2" bolts @ 4' O.C. prior to lifting on second floor.
17. The third module should set on top of the first module, in the same manner as the first. Fasten the second floor rails to the first floor ceiling rails with 16d nails @ 12" O.C.
18. Place the fourth module on top of the second and bolt the floor through pocket provided. Spray foam is put in place around the marriage wall perimeter for every purpose.
19. Complete connection of roof as in numbers 14 and 15. Then, finally, the gable end walls are installed at ends of roof after the roof panels are in place. Outside sheathing is installed between floors around the perimeter and home.
20. Roof center beams must be nailed with a 16d nail @ 8" O.C. in height and 12" O.C. in length, staggered, after leveling the beams to each other.
21. All other finishing, touch-up, electrical and plumbing hook-ups are the builder's responsibility.
22. All electrical systems have been factory installed with connections between modules identified for ease of connection. Local electrical contractor must complete electrical installation in accordance with local code.
23. All plumbing fixtures are stubbed out below the first floor for manifold on site. Second floor plumbing is usually tied together to a common point or drywall is left off the first floor ceiling to facilitate access. All plumbing done on site must be in accordance with local codes.
24. After final connections are complete, the builder should firestop all chase areas to assure a maximum of eight feet of vertical distance. If home is on a crawl space, the chase must also be insulated at bottom. Draft stopping should be applied where applicable such as tub access areas, plumbing penetrations, etc.

COMPANY SET CREW RESPONSIBILITIES

While it is the intent of this set-up guide to list all structure related responsibilities, for the supply of goods and services to be provided by the company, complexity of project may leave some areas undefined. Should a builder have any questions regarding the separation of responsibility for materials or service, contact the manufacturer for clarification.

Typical scope of a manufacturer supplied set crew:

1. Directing movement of house modules from storage area near foundation for unloading under the direction of builder.
2. The set crew chief will visually inspect the foundation for defects and will measure the foundation to assure compliance with the manufacturer-supplied foundation plan.

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3. Remove transportation covering and close-in materials from marriage wall and roof.
4. Inspect foam gasket around marriage wall.
5. Remove lag bolts from carrier.
6. Open roof system (where applicable) from the traveling position. Fasten truss kneewall (where applicable) to ridge.
7. Builder supplied stubwall: It will be the builder's responsibility to set and brace the stubwall prior to the setting of the modular unit onto the foundation. Note that it is the responsibility of the builder to supply the labor and materials for the stubwall and bracing.
8. Set the modular on the foundation and pull the units together.
9. Fold down hinged overhangs soffits.
10. Finish roofing to make weather tight - includes installation of the ridge vent. (This does not apply to structures which do not receive roof systems to be supplied or installed by the builder).
11. Install and sheath roof gable end walls.
12. Level floors, bolt floor center beam installing bolts per plans and specifications.
13. Set the steel support columns in the basement where pads are in place as indicated on the foundation plan supplied by the manufacturer. Bolt the girt and level the floor system.
14. Insert spray insulation foam around perimeter and marriage to create a positive seal.

NOTE: If the manufacturer supplies their own set crew, the builder is responsible for supplying a construction crew to apply wall and roof systems to all modular structures that require on-site construction. The modular units, at connection points to on-site construction by the builder, are usually shipped with a layer of plasticwrap suitable for transportation purposes only. Failure to erect these assemblies on a timely basis may result in serious weather damage to the modular. (Transportation wrap should be checked for weather tightness upon delivery if the units are held for any reason). Typical modular structure requiring site built construction of assemblies are capes and gambrels, though there may be alternative structures that require builder supplied crews to close the unit to the weather.

Work that is usually not performed by a manufacturer supplied set crew:

1. Caulking of siding, roof vents and plumbing stacks.
2. Installation of trim and finish material for gable end soffits and fascia.
3. Make necessary adjustments to factory installed interior/exterior doors for proper working order.
4. Repair drywall cracks.
5. Install siding on any un-sided walls.
6. Installation of interior base and trim molding where appropriate and not factory installed.
7. Installation of window, doors and shutters.
8. Installation of stairs and railings.

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9. Installation of any shipped loose carpet or vinyl goods.
10. Installation of the furnace, water heaters, plumbing connections and/or utility services.

BUILDER'S RESPONSIBILITY FOR FINISHING MODULAR (TYPICAL)

It is the intent of this set-up guide to thoroughly list all structure-related responsibilities for the supply of goods and services by the company. In addition, the site responsibilities typical for a builder are as follows. Again it must be repeated that the complexity of a project may leave some areas undefined. Should the builder have any questions regarding the separation of responsibility for materials or service, contact the manufacturer for clarification.

EXTERIOR RESPONSIBILITIES

1. To install finished rake boards on gable overhangs.
2. Install cornerboards.
3. Install perimeter trim boards.
4. Install shutters where applicable.
5. Install all site applied siding on gable ends and second story modules or areas left off at the time of transporting.
6. Apply building wrap to all unwrapped surfaces prior to the application of any siding, which is to be installed on-site.
7. Adjust glass-sliding door panels, when applicable.
8. Apply bottom-sheathing board that covers sill plate.
9. Install exterior light fixtures, where applicable.
10. Install all shipped loose insulation where applicable, such as under the first floor, under the second floor of a two-story and where the second floor overhangs the first.
11. Supply and install all gutter and down spouts.
12. Supply and install all railings and walks.

INTERIOR RESPONSIBILITIES

1. Install drywall at marriage wall openings.
 2. Install floor sheathing splice at marriage wall openings.
 3. Install basement stairs and handrail (when applicable).
 4. Install marriage wall doors and cased openings.
 5. Adjust all doors and cased openings (if required).
 6. Repair, spackle and paint any drywall cracks.
 7. Install light bulbs and globes on ceiling fixtures.
 8. Install baseboard and other molding at marriage walls, as applicable.
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9. Trim and seam carpeting at marriage wall openings.
10. Install/adjust kitchen/bath shelving and cabinet doors and adjust to open and close properly.
11. FHW/Baseboard drops: connect and furnish all piping below floor joists, the builder supplies boiler, tanks and other component items.
12. Remove protective covering from floors.
13. Sweep and clean house.
14. Install water closet (when applicable).
15. Install plumbing traps (when applicable).
16. When codes require exposed plumbing, the company will supply the necessary materials for finishing the area exposed, however, it will be the responsibility of the builder to finish the exposed area.
17. The builder is responsible for pouring the basement floor to the specifications provided on the manufacturer-supplied drawings consistent with applicable building codes.
18. The builder is responsible for connection of electrical service:
 - a. Connection of lines between modules, where required.
 - b. Connection of electric panel to main service.
 - c. Connection of hot water heater to main.
 - d. Connection of mechanical equipment, furnace, air conditioning, etc., to main.

For structures with unfinished second floor levels, such as Cape Cods; this additional information is applicable:

- a. The builder is responsible for the crane costs to set all materials.
- b. The builder is responsible for the labor costs to construct/finish all materials.
- c. The builder is responsible for securing and making the unit weather tight, if outside roof is being constructed.

The manufacturer may supply the following materials:

1. The stairwell partition knocked down.
2. The kneewall partition knocked down.
3. The sheet rock and insulation to close the stairwell.
4. The door at the top of the stairway is shipped loose.
5. Typically the top stair tread must be cut back for proper tread and rise.