

# MANUFACTURED HOME INSTALLATION

**BLDG INSPECTORS:**  
 Mike Bembenek  
 Lorelei Fuehrer  
 PO Box 37  
 2400 Post Road  
 Plover, WI 54467  
 715-345-5312

VILLAGE OF PLOVER  
 PERMIT FOR

## MANUFACTURED HOME INSTALLATION

Application No.

Parcel No.

Manufactured Home Owners Name:		Mailing Address:			Tel.	
Manufactured Home Park Name:		Lic/Cert#:	Mailing Address:		Tel.	
Manufactured Home Installers Name:		Lic/Cert#:	Mailing Address:		Tel.	
Master Electricians Name:		Lic/Cert#:	Mailing Address:		Tel.	
Master Plumbers Name:		Lic/Cert#:	Mailing Address:		Tel.	
Manufactures Name:		Model:	Year Built:		Serial #:	
Building Address:				Lot No.	Block No.	
Zoning District(s)	Zoning Permit No.	Setbacks:	Front ft.	Rear ft.	Left ft.	Right ft.

### PROJECT DESCRIPTION

Home Width \_\_\_\_\_ Length \_\_\_\_\_

**Minimum Permit Fees: Manufactured Home Installation \$25.00;  
 Occupancy \$25.00; 3'x3' exit landings, steps & rails \$25.00;  
 Plumbing \$25.00; Electrical \$25.00**

### PROJECT COST:

I agree to comply with all applicable codes, statutes and ordinances and with the conditions of this permit; understand that the issuance of the permit creates no legal liability, express or implied, on the state or municipality; and certify that all the above information is accurate. I expressly grant the building inspector, or the inspector's authorized agent, and the assessor permission to enter the premises for which this permit is sought at all reasonable hours and for any proper purpose to inspect the work which is being done.

**APPLICANT'S SIGNATURE**

**DATE SIGNED**

**APPROVAL CONDITIONS:** This permit is issued pursuant to the following conditions. Failure to comply may result in suspension or revocation of this permit or other penalty.

EXIT LANDINGS GREATER THAN 3'X3' & ADDITIONS-SHEDS, CARPORT & GARAGES REQUIRE SEPARATE PERMITS.

CODE COMPLIANT EXITS, PLUMBING & ELECTRICAL SHALL BE COMPLETED BEFORE OCCUPANCY.

**CALL FOR INSPECTIONS BEFORE SKIRTING.**

**CALL FOR INSPECTION BEFORE OCCUPANCY.**

<b>ISSUING JURISDICTION</b>		<input type="checkbox"/> Town <input checked="" type="checkbox"/> Village <input type="checkbox"/> City <input type="checkbox"/> State of:		Municipality Number of Dwelling Location	
		PLOVER		49-173	
<b>FEES:</b>		<b>PERMIT(S) ISSUED</b>	<b>WIS PERMIT SEAL #</b>	<b>PERMIT ISSUED BY:</b>	
Plan Review	\$ _____	<input type="checkbox"/> Construction		NAME _____	
Inspection	\$ _____	<input type="checkbox"/> HVAC		DATE _____ TELEPHONE NO: 345-5312	
Wis. Permit Seal	\$ _____	<input type="checkbox"/> Electrical		Cert. No. _____	
Other	\$ _____	<input type="checkbox"/> Plumbing			
Total	\$ _____	<input type="checkbox"/> Erosion			
		<input type="checkbox"/> Stairs/Landings			

### Manufactured Home Foundation Requirements

Manufactured Home Production Date	Home on Piers (supported by individual footings or a slab)	Home on Basement or Crawlspace	Additions to Home
Pre June 1, 1980	s. DSPS 321.04(2) <ul style="list-style-type: none"> <li>• No anchorage required</li> <li>• No footings below frost depth or frost protection required</li> </ul>	Per any municipal requirements relating to basements or crawlspaces for a pre-June 1, 1980 dwelling	Per any municipal requirements relating to additions to a pre-June 1, 1980 dwelling
June 1, 1980 through March 31, 2007	s. DSPS 321.04(2) <ul style="list-style-type: none"> <li>• No anchorage required</li> <li>• No footings below frost depth or frost protection required</li> </ul>	Per UDC general requirements: <ul style="list-style-type: none"> <li>• Anchorage of home to basement or crawlspace required</li> <li>• Footings of basement or crawlspace below frost depth or frost protected</li> </ul>	Per UDC general requirements: <ul style="list-style-type: none"> <li>• Anchorage of addition to its foundation required</li> <li>• Footings of addition below frost depth or frost protected (see s. DSPS 321.15(1)(e) regarding "floating" structure if home is not supported on frost-protected</li> </ul>
On or after April 1, 2007	s. DSPS 321.04(1) <ul style="list-style-type: none"> <li>• Anchorage required</li> <li>• Footings below frost depth or protected</li> </ul>	Per UDC general requirements: <ul style="list-style-type: none"> <li>• Anchorage required</li> <li>• Footings below frost depth or frost protected</li> </ul>	Per UDC general requirements: <ul style="list-style-type: none"> <li>• Anchorage required</li> <li>• Footings below frost depth or frost protected</li> </ul>

← see approved  
 slab on grade  
 → pier on grade w/pad  
 installation  
 for post 2007  
 installations (see pg 1A-4A)  
 2011-321-97

## Subchapter XI — Installation of Manufactured Homes

321.40 Manufactured Homes

Since April 1, 2007 manufactured homes [formerly know as mobile homes or HUD homes] are required by UDC to meet certain installation standards. Please see information on the Industry Services website under the Manufactured Home program for more complete information on the regulation and installation of these homes. Links from that program page currently include minimum acceptable foundation design, with limitations and also include a draft version of the federal installation standards from HUD.

<http://dsps.wi.gov/Default.aspx?Page=f25a4402-bdda-4abf-b5da-8ff6f802cd8b>

The manufacture date of the home is key to the installation standards that it must follow, as well as the edition of the electrical code and other codes governing the interior of that home. However any site-constructed additions or foundations to such homes are covered by the current UDC, as noted in DSPS 320.04(5)(b) that would require the new home placed on an existing foundation to have that foundation need to be UDC inspected and brought up to current UDC code minimums.

For older manufactured homes being installed on a new site and foundation, DSPS 321.40(2) gives two options. First they can install it per the requirements in effect at the time the manufactured home was produced - this is per the manufacturer's installation instructions that is similar to the post April 1, 2007 homes method. The second option is to install on piers per the 17 minimum requirements of DSPS 321.40(2)(b).

Standards and do not take the home out of compliance with the Manufactured Home Construction and Safety Standards (24 CFR part 3280)."

(c) *Additional definitions.* These are department definitions in addition to the definitions in 24 CFR 3285.5:

1. "Department" means the department of safety and professional services.
2. "HUD" means the federal department of housing and urban development.
3. "Manufactured home section" means a portion of a manufactured home which when installed does not provide all the facilities for year-round residential occupancy.
4. "Manufactured home unit" means a complete manufactured home which when installed provides all the facilities for year-round residential occupancy.

(d) *Substituted definitions.* Substitute the following definitions and informational note for the corresponding definitions in 24 CFR 3285.5:

1. "Approved" means acceptable to the department.
2. "Base flood elevation" means the elevation of the base flood, including wave height, relative to the datum specified on a county's flood hazard map.
3. "Flood hazard area" means the greater of either of the following:
  - a. The special flood hazard area shown on the flood insurance rate map.
  - b. The area subject to flooding during the design flood and shown on a county's flood hazard map, or otherwise legally designated.
4. "Flood hazard map" means a map delineating the flood hazard area and adopted by a county.
5. "Local authority having jurisdiction (LAHJ)" means the department; except where it is used in conjunction with "flood hazard map," in which case it means the county.
6. "Manufactured home" has the meaning given in s. 101.91 (2), Stats.

**Note:** Section 101.91 (2) of the Statutes is reprinted in a Note under section SPS 320.07 (52m).

(e) *Fire separation.* Substitute the following wording for the requirements in 24 CFR 3285.101: Fire separation distances shall be provided in accordance with the distances specified in s. SPS 326.12.

(f) *Flood hazard.* Substitute the following wording and informational note for the requirements in 24 CFR 3285.102(c): Prior to the initial installation of a new manufactured home, the owner or permit applicant is responsible to determine whether the home site lies wholly or partly within a special flood hazard area as shown on the county's flood insurance rate map, flood boundary and floodway map, or flood hazard boundary map. If so located, the map and supporting studies adopted by the county may be used to determine the flood hazard zone and base flood elevation at the site.

**Note:** The department of natural resources and the federal emergency management agency may also have regulations that apply to construction in flood hazard areas.

(g) *Wind loads.* This is a department informational note to be used under 24 CFR 3285.103(a):

**Note:** The HUD-required wind loads for Wisconsin, Zone 1, are not less than 15 psf horizontal and not less than 9 psf uplift.

(h) *Roof loads.* This is a department informational note to be used under 24 CFR 3285.103(b):

**Note:** See appendix for a reprint of HUD's roof-load zone map.

(i) *Thermal zone.* This is a department informational note to be used under 24 CFR 3285.103(c):

## Subchapter XI — Installation of Manufactured Homes

**SPS 321.40 Installation standards. (1) PRODUCED ON OR AFTER APRIL 1, 2007.** (a) *Adoption of standards.* The federal *Model Manufactured Home Installation Standards*, 24 CFR part 3285, as in effect on April 1, 2013, is hereby incorporated by reference into this chapter.

**Note:** A copy of this edition of 24 CFR 3285 is on file in the offices of the Department and the Legislative Reference Bureau. Copies of 24 CFR 3285 are available at <http://www.gpo.gov/fdsys/granule/CFR-2013-title24-vol5/CFR-2013-title24-vol5-part3285>.

**Note:** Section 24 CFR 3285.1(a)(1) reads as follows: "States that choose to operate an installation program for manufactured homes in lieu of the federal program must implement installation standards that provide protection to its residents that equals or exceeds the protection provided by these Model Installation Standards."

(b) *Compliance.* A manufactured home produced on or after April 1, 2007, shall be installed in accordance with 24 CFR part 3285 except as otherwise provided by this subsection.

**Note:** As provided under 24 CFR 3285.1(a)(intro.), "The manufacturer's installation instructions, including specific methods for performing a specific operation or assembly, will be deemed to comply with these Model Installation Standards, provided they meet or exceed the minimum requirements of these Model Installation

Note: The HUD-required thermal zone for Wisconsin is Zone 3, for an overall maximum coefficient of heat transmission not to exceed 0.079 Btu/(hr.)(sq. ft.)(°F).

(j) *Soil test.* This is a department requirement in addition to the requirements in 24 CFR 3285.202(a): Where a community-wide soil test does not exist and a soil test is required by this chapter, such as for a proposed frost-free foundation design, the test shall be conducted to determine the soils in the entire community rather than at an individual site.

(k) *Footings and foundations.* This is a department requirement in addition to the requirements in 24 CFR 3285.301: Footings and foundations may be designed in accordance with subchs. IV and V, which include a frost depth of at least 48 inches.

(L) *Caps.* Substitute the following wording for the requirements in 24 CFR 3285.304(b)(2): A combination of up to two 4-inch-thick solid-concrete blocks and no more than one 2-inch-thick piece of hardwood lumber shall be permitted as cap

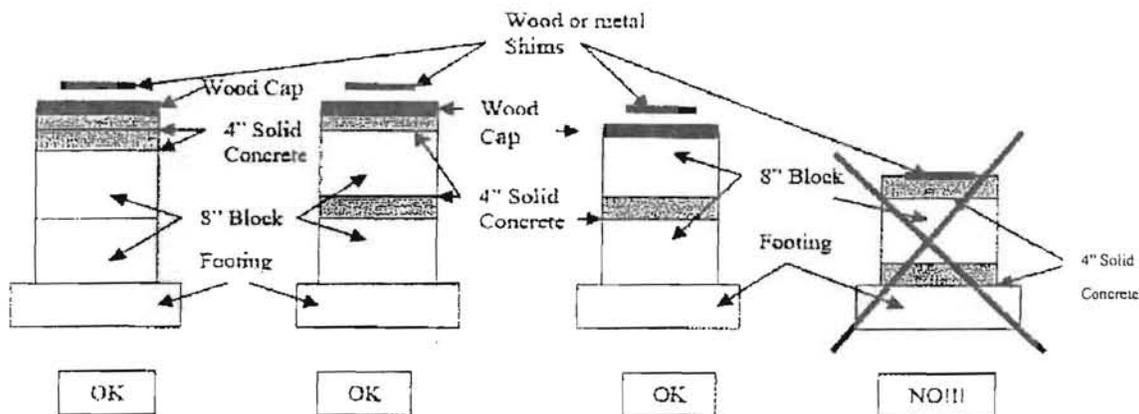
material. Lumber used as cap and gap filler material may be of 2-inch nominal lumber at least equal to No. 2 spruce/pine/fir having a minimum fiber bending stress rating of 1200 psi. All lumber used as cap and gap filler shall be the same species of wood. Lumber used to fill a gap in the pier may only be placed at the top of the pier.

(m) *Gaps.* This is a department informational note to be used under 24 CFR 3285.304(c)(1):

Note: See lumber specifications under par. (L).

(n) *Additional blocking.* Substitute the following wording for the requirements in 24 CFR 3285.304(c)(3): If a pier is provided with a cap block of 4-inch concrete or 2-inch lumber, another 4-inch concrete block may be placed anywhere in the pier but may not be placed directly upon the footing.

(o) *Illustration.* This is a department figure to be used under 24 CFR 3285.304:

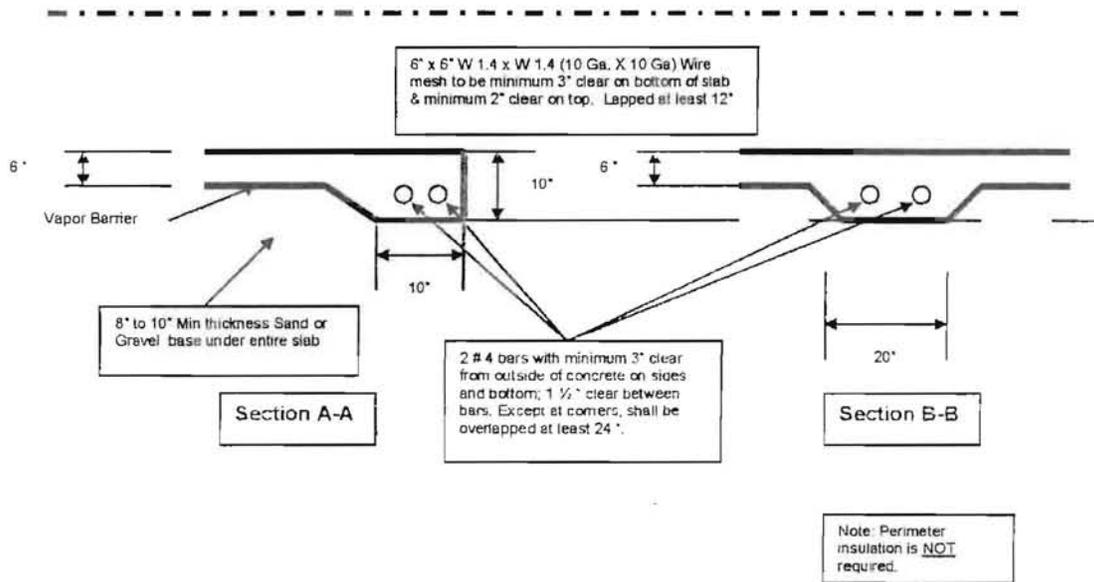
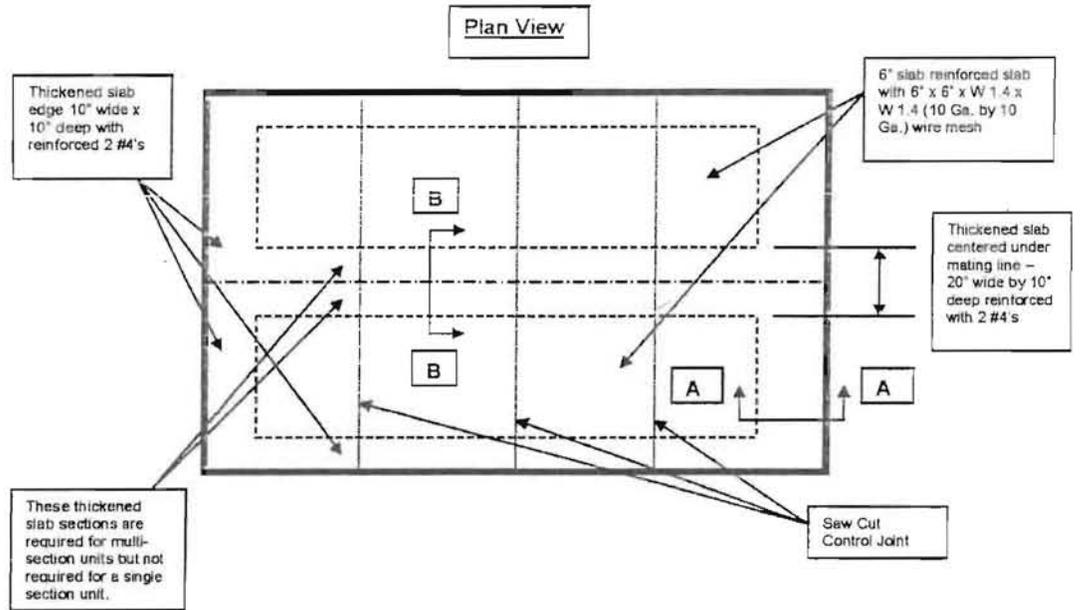


(p) *Footings and foundations.* This is a department requirement in addition to the requirements in 24 CFR 3285.312: Footings and foundations may be designed in accordance with any of the following:

1. Subchs. IV and V.

2. The department-approved slab design that is shown in the figure and limitations at the end of this paragraph.
3. Other proprietary designs approved by the department.

Acceptable slab on grade for pier supported manufactured home produced on or after April 1, 2007  
[per SPS 321.40 (1)]



**Limitations:**

1. Minimum 3,000 psi concrete. [24 CFR 3285.312(a)(1)(ii)]
2. Rebar and mesh at least grade 40.
3. Soil bearing capacity at least 2,000 psf. [SPS 321.40 (2) (b) 2.]
4. Placed on undisturbed soil. May not be placed on unprepared fill material, organic soil, alluvial soil, mud, or frozen soil. [SPS 321.40 (2) (b) 1. and 24 CFR 3285.312(a)]

The Wisconsin Administrative Code on this web site is updated on the 1st day of each month, current as of that date. See also Are the Codes on this Website Official?

5. 8 to 10" of clean, graded sand, gravel, or crushed stone base in clay soils. [SPS 321.20 (2) with added thickness to resist frost.] Compaction of sand, etc., should be 95% of modified Proctor.
6. 6 mil vapor retarder overlapped 12 inches and sealed. [24 CFR 3285.204]
7. Maximum pier spacing of 7 feet with max. load per pier of 5,300 lbs. when placed on 6" thick slab. [SPS 321.40 (2) (b) 10. and 24 CFR 3285.310]
8. Maximum load per pier of 11,900 lbs. at mating line when centered on the 20" W. X 10" D. thickened slab, Section B-B, reinforced with 2 - #4 bars. Individual pier footings at mating line meeting sizing requirements in 24 CFR 3285 Table to 3285.312 may be used in lieu of continuous thickened slab. [24 CFR 3285.312(c)]
9. Site shall drain away from the home per SPS 321.12. Ensure drainage of sand fill zone so that any clay does not cause water to pool under the slab.
10. The water table may not be above the frost penetration depth, i.e. at least 4 feet below grade. [SPS 321.16 (1) (a)]
11. Saw cut joints in slab so that sections are approximately square. (Example: 16' by 76' slab = 4 segments.)

(q) *Anchors and tie-down straps.* This is a department requirement in addition to the requirements in 24 CFR 3285.402(b)(1) and (2): Ground anchors and tie-down straps may be of painted steel to provide the weather-deterioration protection required by this section.

(r) *Severe climate.* Substitute the following wording for the requirements in 24 CFR 3285.404: In frost-susceptible soil locations, ground-anchor augers shall be installed to the design depth of the anchor but not less than 30 inches, unless the foundation system is frost-protected to prevent the effects of frost heave, in accordance with acceptable engineering practice and ss. 24 CFR 3280.306 and 3285.312.

(s) *Ventilation openings.* Substitute the following wording for the requirements in 24 CFR 3285.505(d): Ventilation openings shall be covered for their full height and width with a perforated corrosion- and weather-resistant covering that is designed to prevent entry of rodents.

(t) *Plumbing.* This is a department informational note to be used under 24 CFR 3285.601:

**Note:** The Department's rules relating to registration and licensing of plumbers are in chapter SPS 305. The Department's rules relating to pipe supports; pitch of sanitary drainage piping, storm water or clear water piping, and water supply piping; and plumbing specific to manufactured homes and manufactured home communities are in chapter SPS 382.

(u) *Access for a transporter.* Substitute the following wording for the recommended requirements in 24 CFR 3285.902(a): Before attempting to move a home, ensure that the transportation equipment and home can be routed to the installation site and that all special transportation permits required by the department of transportation have been obtained.

(v) *Drainage structures.* Substitute the following wording for the recommended requirements in 24 CFR 3285.902(b): The use of ditches and culverts to drain surface runoff is subject to local and state regulations and shall be included and considered in the overall site preparation.

(w) *Local permits.* Substitute the following wording and informational note for the recommended requirements in 24 CFR 3285.903(a): All locally required permits shall be obtained and all corresponding fees shall be paid.

**Note:** See section SPS 320.08 for the Department's requirements for obtaining a Wisconsin uniform building permit prior to each installation.

(x) *Local plan approval.* Substitute the following wording for the recommended requirements in 24 CFR 3285.903(b): Prior to alteration of a home's pier blocking, the local municipality shall be contacted to determine if plan approval and permits are required.

(y) *Accessory buildings and structures.* Substitute the following wording for the recommended requirements in 24 CFR 3285.903(c): Each accessory building and structure is designed to support all of its own live and dead loads, unless the structure, including any attached garage, carport, deck, or porch, is attached to the manufactured home and is otherwise included in the installation instructions.

(z) *Contacting the utility providers.* Substitute the following wording for the recommended requirements in 24 CFR

3285.904(a): The utility providers shall be consulted before connecting the manufactured home to any utilities.

(za) *Conversion of gas appliances.* Substitute the following wording for the recommended requirements in 24 CFR 3285.904(d)(1): A service person acceptable to the utility provider shall convert the appliance from one type of gas to another, following instructions by the manufacturer of each appliance.

(zb) *Gas appliance startup procedures.* Substitute the following wording for the recommended requirements in 24 CFR 3285.904(d)(4)(intro.): When required by the utility provider, the installer shall perform the following procedures:

(zc) *Heating oil systems.* This is a department informational note to be used under 24 CFR 3285.905:

**Note:** See chapter ATCP 93 for additional requirements relating to installation of heating oil systems.

(2) **PRODUCED BEFORE APRIL 1, 2007.** (a) Except as provided in par. (b), the installation of a manufactured home produced before April 1, 2007 shall be installed in conformance with the requirements in effect at the time the manufactured home was produced.

(b) The installation of a manufactured home produced before April 1, 2007 to be installed on piers shall conform to at least all of the following requirements:

1. No footing may be placed upon unprepared fill material, topsoil, alluvial soil or mud. All organic matter shall be removed from the area that will be beneath any footing.

2. The soil bearing capacity shall be determined through test by a pocket penetrometer or other means of analysis. If the soil bearing capacity under each intended pier location is less than 2000 pounds per square foot, piers shall be located in accordance with the manufacturer's instructions.

3. The home site shall be graded to permit water to drain from under the home and away from the home for a minimum of 5 feet from the home.

4. Every pier shall be supported by a footing. Each footing shall be no less than a nominal 16 inches by 16 inches.

5. Each footing shall consist of one of the following:

a. One nominal 4-inch by 16-inch by 16-inch solid concrete block or 2 nominal 4-inch by 8-inch by 16-inch solid concrete blocks. If a single block pier and 2 footing blocks are used, the 2 footing blocks shall be positioned with the joint parallel to the main frame. If a double block pier and 2 footing blocks are used, the 2 footing blocks shall be positioned with the joint either parallel or perpendicular to the main frame.

b. A 16-inch by 16-inch pad constructed of acrylonitrile-butadiene-styrene (ABS) having a rated load bearing capacity of not less than 6000 pounds.

c. An 18-inch diameter hole bored to below the frost line or to unfractured bedrock and filled with poured concrete.

d. Any other materials and systems approved in advance by the department.

6. Piers shall be constructed of concrete blocks, manufactured steel stands or manufactured concrete stands. Manufactured stands shall be labeled for use as piers for manufactured homes.

7. Piers constructed of single stacked concrete blocks shall be limited to a height of 36 inches. Piers constructed of concrete blocks and exceeding 36 inches but less than 80 inches shall be constructed using double stacked blocks with each layer opposing

the direction of the layer underneath it. Piers constructed of concrete blocks and exceeding 80 inches shall be constructed using double blocks laid in concrete mortar with each layer opposing the direction of the layer underneath it and with each core filled with concrete and a ½-inch steel reinforcing rod.

8. All concrete blocks shall be 2-core design, construction grade blocks having nominal dimensions of at least 8 inches by 8 inches by 16 inches. All concrete blocks shall be placed with the cores open vertically. The concrete block nearest the main frame of the manufactured home shall be perpendicular to the linear direction of the frame. None of these concrete blocks may contact the main frame of the home.

9. Alternative materials may be used for pier installations provided they are approved in advance by the department.

10. Piers shall be placed under the main frame of the chassis at intervals of not more than 7 feet on-center and no more than 3 feet from the exterior side of each end wall. The 7-foot spacing requirement may be varied as permitted by footing, spacing and soil capacity tables provided by the home manufacturer.

11. Piers shall be placed under the bearing points of clear-span openings of 4 feet or more in center mating walls.

12. Piers shall be plumb and centered under the contact area at the point of support.

13. a. Each pier shall be capped with a solid concrete block at least 4 inches thick or a solid wood block having a nominal thickness of at least 2 inches.

b. The cap shall be the same width and length as the top of the pier.

c. The cap shall consist of no more than 2 pieces.

d. Two-piece caps shall be positioned with the joint perpendicular to the main frame.

14. Where shims are utilized, wood shims shall be installed between the pier cap and the frame. Shims shall be driven from opposing sides and shall be no less than 4 inches by 8 inches.

15. Wood caps and shims shall be at least equal to No. 2 spruce pine fir having a minimum fiber bending stress rating of 1200 psi. All wood caps shall be the same species of wood, and all shims shall be the same species of wood.

16. The combination of a nominal 2-inch solid concrete block or a nominal 2-inch wood cap plus shims shall not exceed 3 ½ inches.

17. A minimum clearance of 12 inches shall be maintained beneath the lowest point of the main frame in the area of any utility connection. A minimum clearance of 12 inches shall also be maintained under the home for at least 75% of the home. The remainder of the home may be less than 12 inches above the ground but may not touch the ground.

**History:** CR 05-113; cr. Register December 2006 No. 612, eff. 4-1-07; CR 08-043; am. (2) (b) 13, Register March 2009 No. 639, eff. 4-1-09; CR 14-017; r. and recr. (1), cr. (2) (title), am. (2) (b) 8, Register August 2014 No. 704, eff. 9-1-14; correction in numbering in (1) (za) to (zc) made under s. 13.92 (4) (b) 1., Stats., Register August 2014 No. 704; correction in (1) (p) (intro.) made under s. 13.92 (4) (b) 7., Stats., Register August 2014 No. 704; corrections in (1) (g) to (i) made under s. 35.17, Stats., Register August 2014 No. 704.



Evaluation #

201231 - O  
FN 20129031

Safety & Buildings Division  
201 West Washington Avenue  
P.O. Box 2658  
Madison, WI 53701-2658

*2007+  
installation!*  
*Per  
Duane  
H.*

## Wisconsin Alternate Standard Evaluation

Standard

WHA Manufactured Home Frost-Protected Foundation Design

### SCOPE OF EVALUATION

The alternative foundation design of the Wisconsin Housing Alliance has been evaluated for compliance with the related foundation design requirements of the current **Wisconsin Uniform Dwelling Code** s. SPS 321.40 and 321.15 - 321.18 for manufactured homes produced after April 1, 2007. Pursuant to s. SPS 320.24(3), the alternate standard and methodology as described below, and attached, is approved for use in the State of Wisconsin to satisfy the intent of the manufactured home foundation requirements found with the **Wisconsin Uniform Dwelling Code**.

### DESCRIPTION AND USE

This alternate standard allows the placement of manufactured home foundations that do not extend to the greater of 48" below grade or the local frost depth.

### LIMITATIONS OF APPROVAL UNIFORM DWELLING CODE

This approval is only valid for manufactured homes.

When this alternative standard has been utilized in the design of a project, a statement identifying that use shall be included with the project construction documents, including the Wisconsin

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Alternative Standard Evaluation number referenced above. Additionally, a copy of the attached Frost Free Design Usage Agreement, signed by the installer and by a representative of the Wisconsin Housing Alliance shall be provided to the enforcing code official.

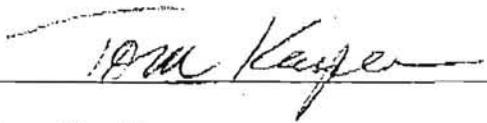
**DISCLAIMER**

The department is not endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive or modify any code requirement not specified in this document.

**EXPIRATION**

This approval will be valid through December 31, 2017, unless modifications are made to the alternate standard and methodology or a re-examination is deemed necessary by the department.

Reviewed by: TGK



Approval Date: April 14, 2012    By: Tom Kasper.  
Section Chief  
Division of Safety & Buildings

# Manufactured Home Frost Protected Foundation Design

TABLE SPS 321.18-A SOIL LATERAL LOAD

Description of Backfill Material	Unified Soil Classification	Design Lateral Soil Load <sup>a</sup> PSF per Foot of Depth
Well graded, clean gravels; gravel-sand mixes	GW	30c
Poorly graded clean gravels; gravel-sand mixes	GP	30c
Silty gravels, poorly graded gravel-sand mixes	GM	40e
Clayey gravels, poorly graded gravel-and-clay mixes	GC	45e
Well-graded, clean sands; gravelly sand mixes	SW	30c
Poorly graded clean sands; sand-gravel mixes	SP	30c
Silty sands, poorly graded sand-silt mixes	SM	45e
Sand-silt clay mix with plastic fines	SM-SC	45d
Clayey sands, poorly graded sand-clay mixes	SC	60d
Inorganic silts and clayey silts	ML	45d
Mixture of inorganic silt and clay	ML-CL	60d
Inorganic clays of low to medium plasticity	CL	60d
Organic silts and silt clays, low plasticity	OL	b
Inorganic clayey silts, elastic silts	MH	60d
Inorganic clays of high plasticity	CH	b
Organic clays and silty clays	OH	b

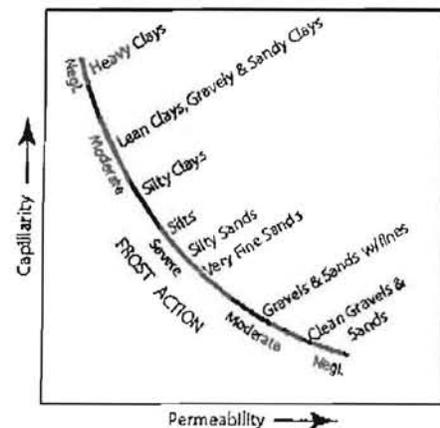
<sup>a</sup>Design lateral soil loads are given for moist conditions for the specified soils at their optimum densities. Actual field conditions shall govern. Submerged or saturated soil pressures shall include the weight of the buoyant soil plus the hydro-static loads.

<sup>b</sup>Unsuitable as backfill material.

<sup>c</sup>For relatively rigid walls, as when braced by floors, the design lateral soil load shall be increased for sand and gravel type soils to 60 psf per foot of depth. Basement walls extending not more than 8 feet below grade and supporting flexible floor systems are not considered relatively rigid walls.

<sup>d</sup>For relatively rigid walls, as when braced by floors, the design lateral load shall be increased for silt and clay type soils to 100 psf per foot of depth. Basement walls extending not more than 8 feet below grade and supporting flexible floor systems are not considered relatively rigid walls.

<sup>e</sup>Soil classes are in accordance with the Unified Soil Classification System, ASTM D2487, and design lateral loads are for moist soil conditions without hydrostatic pressure.



# Manufactured Home Frost Protected Foundation Design

### Notes:

1. This design requires non frost susceptible soil therefore a soils evaluation must be performed. The design is also not a substitute for compliance with other aspects of the manufacturer's installation instructions. The soils evaluation shall be performed by a Wisconsin-certified soil tester (CST) or a Wisconsin-licensed professional soils scientist (PSS).

2. This design is for locations with non-frost susceptible soils or where the site has been improved by substitution of a non-frost susceptible base to a depth of 10 inches. Any introduced fill shall be compacted to 95% of modified Proctor. To minimize the chances of frost action due to subsurface ground water, establish that the ground water table during the winter season is below the 48 inch frost line. If ground water depth is determined to be above the local frost depth, this design cannot be used. The determination of the ground water table shall be performed by a CST or PSS to establish "High groundwater elevation" as the higher of the elevation to which the soil is saturated when observed as a free water surface, or the elevation to which the soil has been seasonally or periodically saturated as indicated by the highest elevation of redoximorphic features in the soil profile as defined in SPS 381.01(119).

3. All drainage shall be diverted away from the home and grading must slope a minimum of 1/2-inch per foot away from the foundation for a distance of 10 feet. When site conditions do not allow the grade to slope for a distance 10 feet, a drain tile may be installed, sloping away and terminating at more than 10 feet from the home.

4. Rain gutters or drain tile shall be installed to direct water no less than 5 feet from the home.

5. A perimeter enclosure is required meeting requirements provided by the manufacturer's installation manual. Any perimeter enclosure terminating above the frost line must be designed so as not to transfer forces due to frost heave to the home.

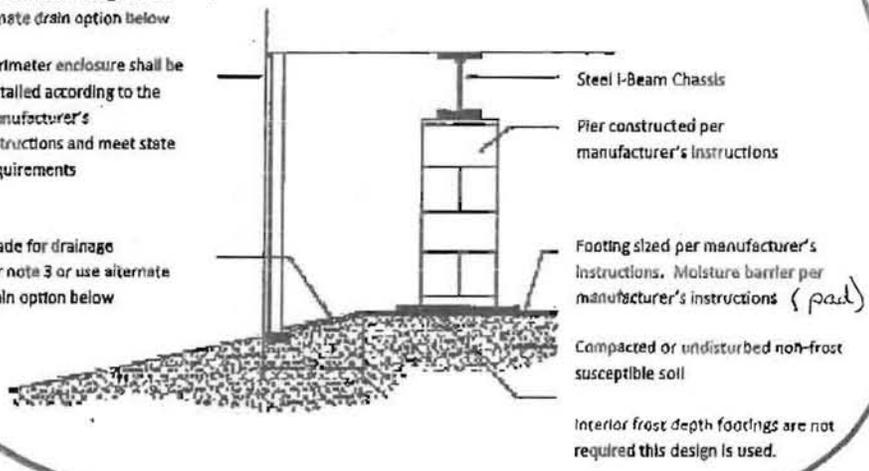
6. Venting of the enclosure shall follow the manufacturer's instructions.

Install gutters if permitted by manufacturer's design or use alternate drain option below

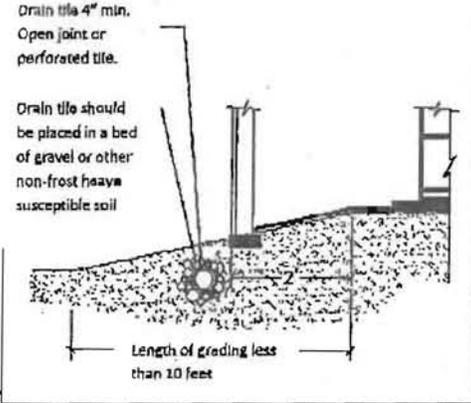
Perimeter enclosure shall be installed according to the manufacturer's instructions and meet state requirements

Grade for drainage per note 3 or use alternate drain option below

## Interior Support



### Detail A: Alternative Drainage Option



### Non-Frost Susceptible Soils

Frost heaving requires a frost-susceptible soil, a continual supply of water below (a water table) and freezing temperatures, penetrating into the soil. Frost-susceptible soils are those with pore sizes between particles and particle surface area that promote capillary flow. Silty and loamy soil types, which contain fine particles, are examples of frost-susceptible soils. The Wisconsin Uniform Dwelling Code adopts the 2001 ASCE 32 standard, Design & Construction of Frost-Protected Shallow Foundations, which classifies soil as being frost susceptible if 6 percent or more constituent particles pass through a 0.075 mm (No. 200) sieve.

Non-frost-susceptible soils from Table SPS 321.18-A include those not crossed out on page 2 of this design.

### Perimeter Support

Perimeter support shall be according to the manufacturer's instructions but generally shall be by one of these types:

1. An engineered support beam transferring the load back to the nearest support column.
2. A frost protected pier within 18 inches of the perimeter wall.
3. A frost protected perimeter wall made of masonry or other material.