**4781-6-03.4 Anchorage against wind.**

(A) Anchoring instructions.

(1) After blocking and leveling, the manufactured home shall be secured against the wind by use of anchor assembly type installations or by connecting the home to the alternative foundation system. See rule ~~4781-6-02.3~~4781-6-03.3 of the Administrative Code.

(2) For anchor assembly type installations, the installation shall ensure the manufactured home is secured against the wind as described in this section. Installations not completed in accordance with the ~~manufactured~~manufacturer's installation instructions shall meet these standards or be designed by an Ohio registered professional engineer or registered architect in accordance with acceptable engineering practice, the design loads of the MHCSS, and rule ~~4781-6-02.3~~4781-6-03.3 of the Administrative Code.

(3) All anchoring and foundation systems shall be capable of meeting the loads that the manufactured home was designed to withstand as required by the MHCSS and rule ~~4781-6-02.3~~4781-6-03.3 of the Administrative Code ~~and that~~as well as the loads the manufactured home was designed to withstand as shown on the home's data plate. However, if a home is placed in a zone ~~which~~that is less than the zone on the data plate, then the anchoring and foundation requirements may be designed to the zone in which the home is placed; unless specifically excluded by the manufacturer of the home.

(4) When an Ohio registered professional engineer or registered architect designs anchoring, the installation instructions are to include at least the following information and details for anchor assembly type instructions:

(a) The maximum spacing for installing diagonal ties and any required vertical ties or straps to ground anchors;

(b) The minimum and maximum angles or dimensions for installing diagonal ties or straps to ground anchors and the main chassis members of the manufactured home;

(c) Requirements for connecting the diagonal ties to the main chassis members of the manufactured home. If the diagonal ties are attached to the bottom flange of the main chassis beam, the frame shall be designed to prevent rotation of the beam;

(d) Requirements for longitudinal and mating wall tie downs and anchorage;

(e) The method of strap attachment to the main chassis member and ground anchor~~;~~, including provisions for swivel-type connections;

~~(f)~~ (f) ~~The method of strap attachment to the main chassis member and ground anchor; including provisions for swivel-type connections;~~

~~(g)~~ (f) As applicable, the requirements for sizing and installation of stabilizer plates.

(B) Ground anchor installations.

(1) Specifications for tie-down straps and ground anchors.

(a) Ground anchors.

Ground anchors shall be listed, be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 ounces per square foot of surface coated, and be capable of resisting a minimum ultimate load of four thousand seven hundred twenty-five pounds and a working load of three thousand one hundred fifty pounds, unless reduced capacities are noted in accordance with note 11 of table 4.1 of this rule or note 12 of tables 4.2 and 4.3 of this rule. The ultimate load and working load of ground anchors and anchoring equipment shall be determined by a registered professional engineer, registered architect, or tested by a nationally recognized third party testing agency in accordance with a nationally recognized testing protocol that meets or exceeds the certification and testing protocols as set forth in 24 C.F.R. 3285.402(b).

(b) Tie-down straps.

A one and one-quarter inch by thirty-five ~~hundreds~~hundredths of an inch or larger steel strapping conforming to ASTM D ~~3953-97~~3953, "Standard Specification for Strapping, Flat Steel and Seals, Type 1 Grade 1, Finish B," with a minimum total capacity of four thousand seven hundred twenty-five pounds and a working capacity of three thousand one hundred fifty pounds shall be used. The tie-down straps shall be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 ounces per square foot of surface coated. Slit or cut edges of coated strapping need not be zinc~~-~~-coated.

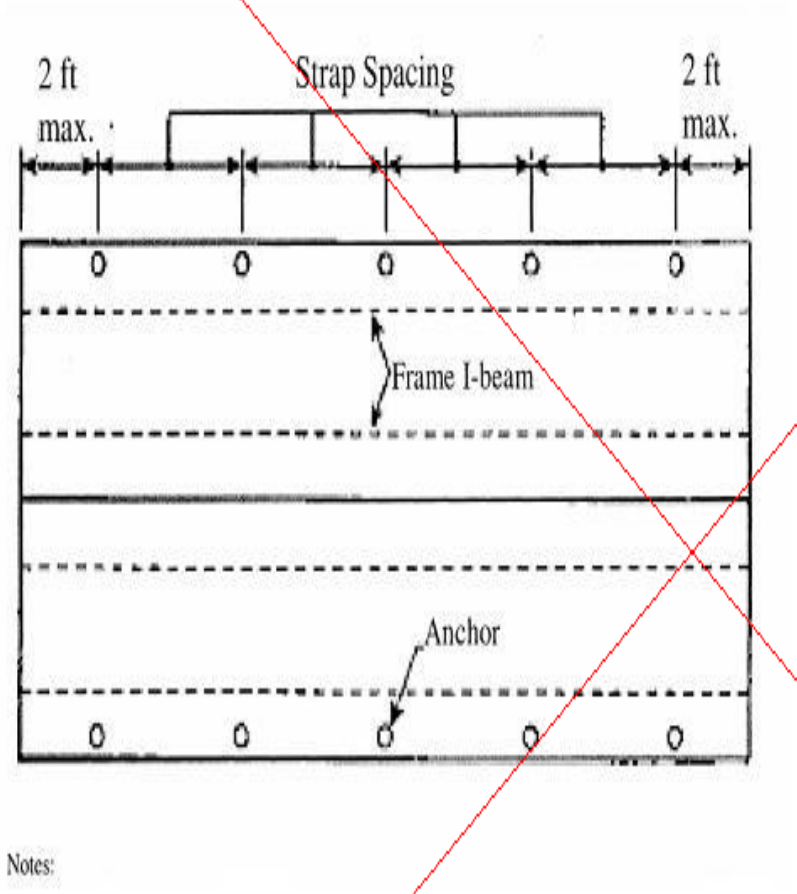
(2) Number and location of ground anchors.

(a) Ground anchor and anchor strap spacing shall be:

(i) No greater than the spacing shown in tables 4.1 to 4.3 of this rule and figures 4A and 4B of this rule; or

(ii) Designed by an Ohio registered engineer or architect in accordance with acceptable engineering practice, Chapter 4781-6 of the Administrative Code, and the requirements of the MHCSS.

## Figure 4A- Ground Anchor Spacing Plan View

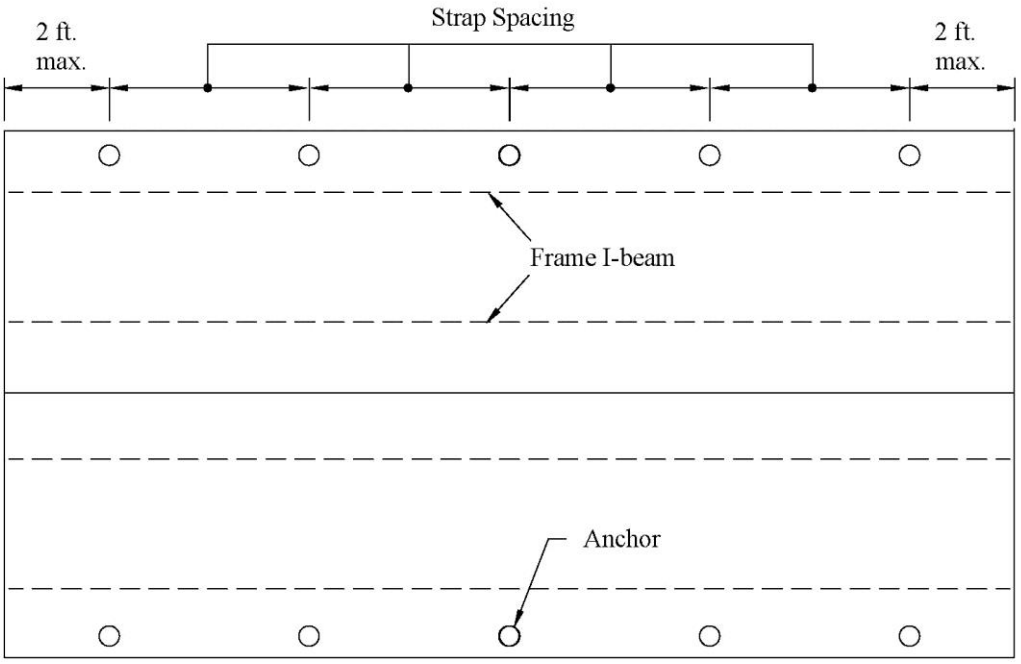



Notes:

1. In Ohio refer to Table 4.1 of this section for maximum ground anchor spacing. Tables 4.2 and 4.3 are included for reference.

2. Longitudinal anchors are not shown for clarity. Refer to 4781-6-02.4 B (2)(b) for longitudinal anchoring requirements.

Figure 4A - Ground Anchor Spacing Plan View,




Notes:

1. In Ohio refer to Table 4.1 of this section for maximum ground anchor spacing. Tables 4.2 and 4.3 are included for reference.

2. Longitudinal anchors are not shown for clarity. Refer to 4781-6-03.4B(2)(b) for longitudinal anchoring requirements.

(b) Longitudinal anchoring. Manufactured homes in Ohio are not required to be stabilized against the wind in the longitudinal direction unless specified in the manufacturer's installation manual or by an Ohio registered professional engineer or registered architect. An Ohio registered professional engineer or registered architect shall design alternative longitudinal anchoring methods in accordance with acceptable engineering practice.

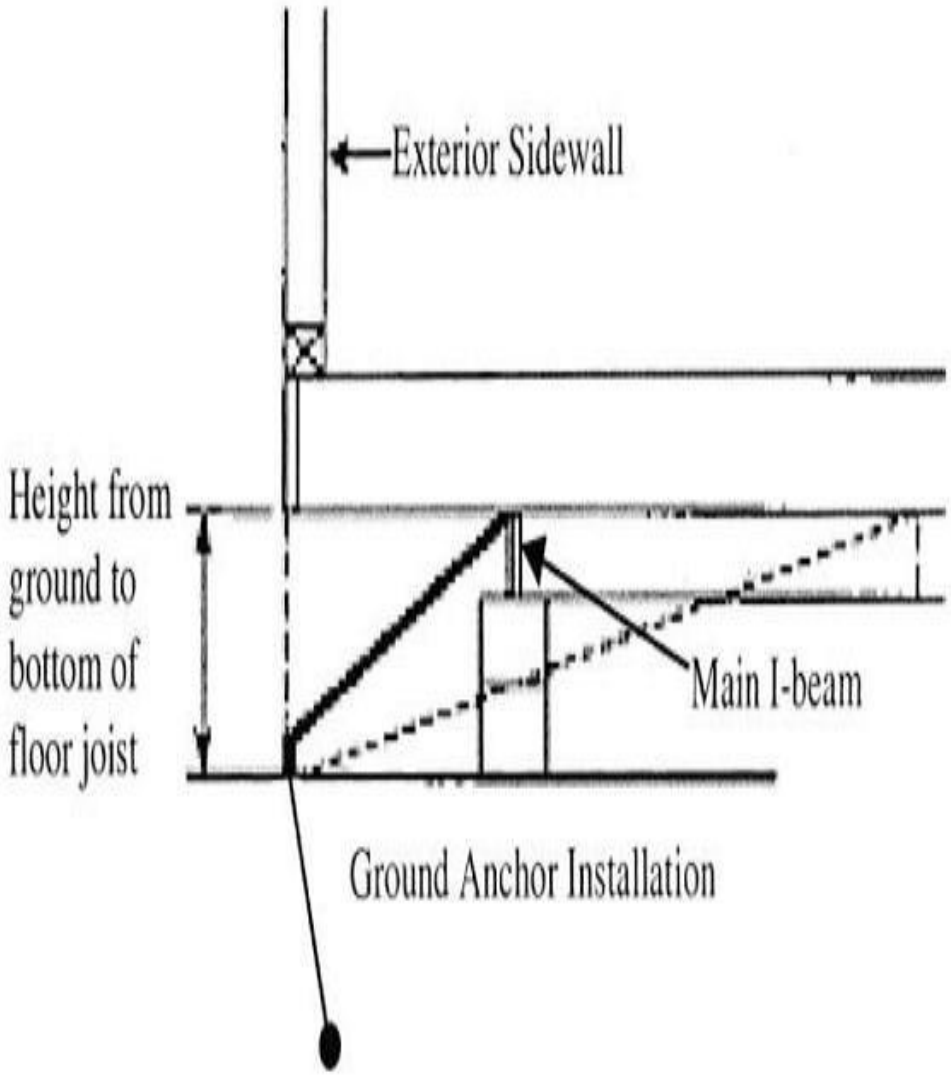
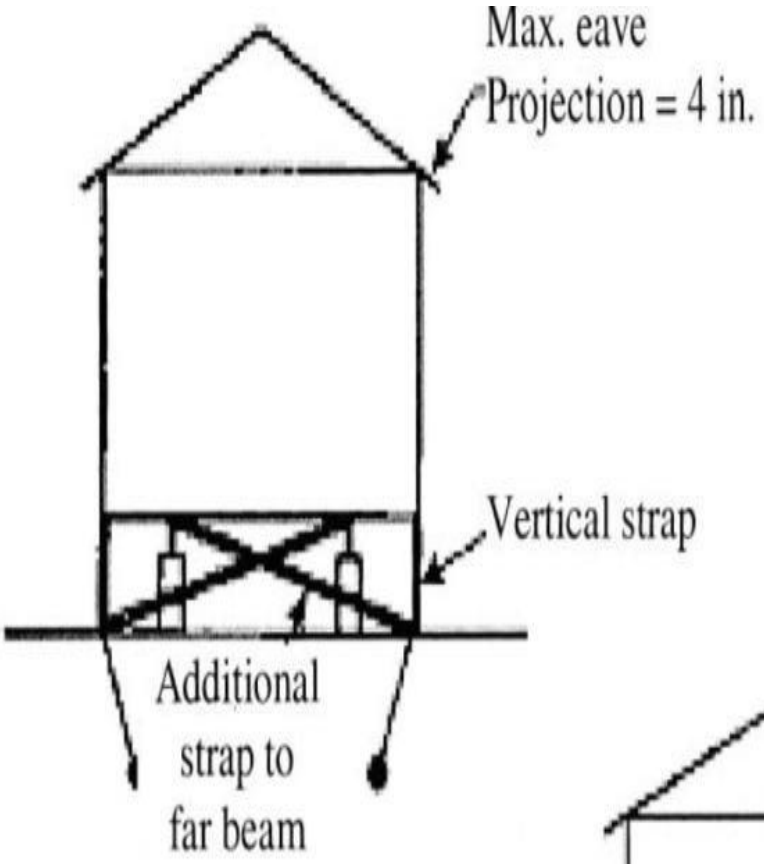


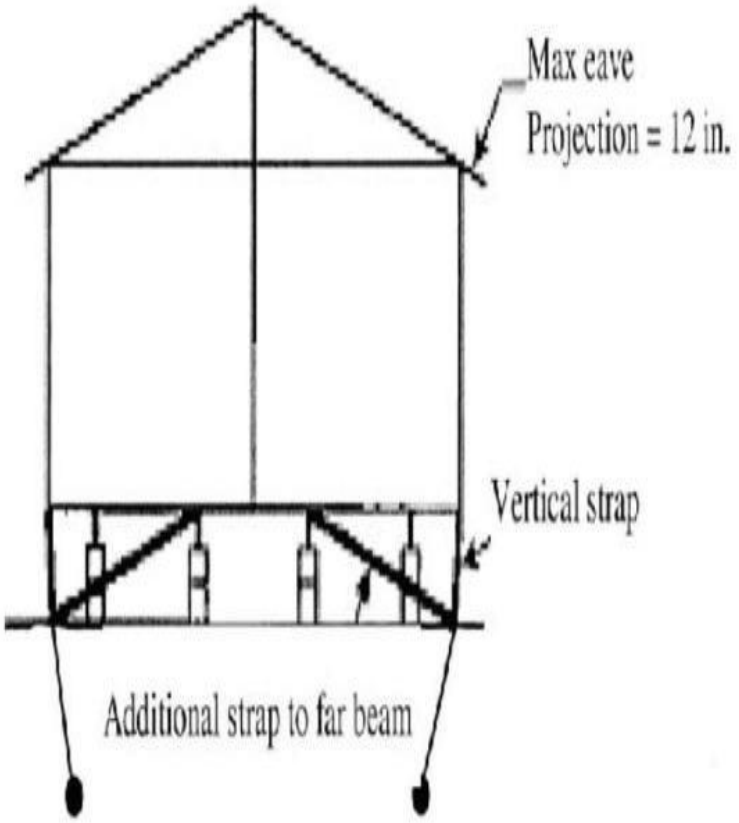

**Figure 4-B Anchor Strap and Pier Relationship**

Notes:

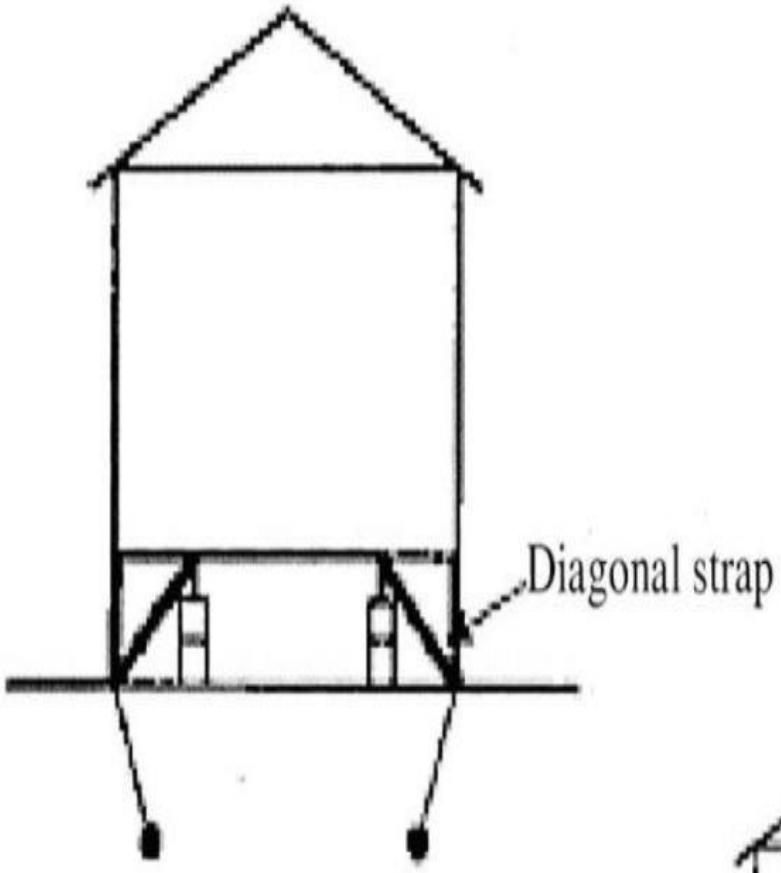
1. Vertical Straps are not required in Ohio or in Wind Zone 1 unless specified by the manufacturer or a design professional.
2. The frame must be designed to prevent rotation of the main chassis beam, when the diagonal ties are not attached to the top flange of the beam. In general, diagonal ties shall be attached to the top flange of the beam.



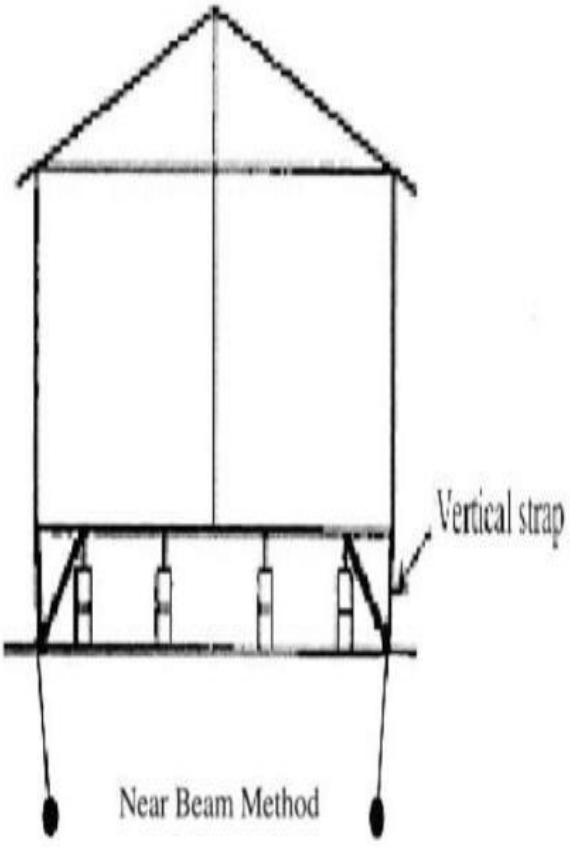

Second Beam Method
(Vertical tiedown straps required)




Second Beam Method
(Mate-line piers and anchors omitted for clarity)




Near Beam Method




Near Beam Method

(Mateline piers and anchors omitted for clarity)

(c) The requirements in this rule shall be used to determine the maximum spacing of ground anchors and their accompanying anchor straps based on the soil classification determined in accordance with rule ~~4781-6-02.2~~4781-6-03.2 of the Administrative Code.

(i) The installed ground anchor size (length) shall be for the listed soil class.

(ii) All ground anchors shall be installed in accordance with their listing or certification and the ground anchor manufacturer's installation instructions.

(iii) Plate size and type. The size and type of stabilizer plate to be provided shall be determined by the manufacturer of the anchor in accordance with the ground anchor listing or certification. Metal stabilizer plates shall be provided with protection against weather deterioration and corrosion at least equivalent to that provided by a coating of zinc on steel of not less than 0.30 ounces per square foot of surface coated. Alternatively, ABS stabilizer plates may be used when listed and certified for such use.

(3) Each ground anchor shall be manufactured and provided with installation instructions in accordance with its listing or certification. A nationally recognized testing agency shall list, or a registered professional engineer or registered architect shall certify, the ground anchor for use in a classified soil (see rule ~~4781-6-02.2~~4781-6-03.2 of the Administrative Code) based on a nationally recognized testing protocol.

## Table 4.1 – Maximum Diagonal Tiedown Strap Spacing, Wind Zone I.

| Nominal Floor Width, Single Section/Multi-section | Max. Height from Ground to Diagonal Strap Attachment | I-Beam Spacing (82.5 in. max.) | I-Beam Spacing (99.5 in. max.) |
|---|---|---|---|
| 12/24 ft. 132 in to 155 in. section(s) | 25 in. | 14 ft 2 in. | 9 ft 9 in. |
| | 33 in. | 11 ft 9 in. | 7 ft 8 in. |
| | 46 in. | 9 ft. 1 in. | 5 ft 8 in. |
| | 67 in. | 6 ft. 6in. | 4 ft 0 in. |
| 14/28 ft, 156 in to 179 in. section(s) | 25 in. | 18 ft. 2 in. | 15 ft 11 in. |
| | 33 in. | 16 ft 1 in. | 13 ft 6 in. |
| | 46 in. | 13 ft 3 in. | 10 ft 8 in. |
| | 67 in. | 10 ft 0 in. | 7 ft 9 in. |
| 16/32 ft, 180 in. to 204 section(s) | 25 in. | 20 ft 7 in. | 19 ft 5 in. |
| | 33 in. | 19 ft 0 in. | 17 ft 5 in. |
| | 46 in. | 16 ft 5 in. | 14 ft 7 in. |
| | 67 in. | 13 ft 1 in. | 11 ft 3 in. |

Notes:

1. Table is based on maximum 90 in. sidewall height.
2. Table is based on maximum 4 in. inset for ground anchor head from edge of floor or wall.
3. Table is based on main rail (I-beam) spacing per given column.
4. Table is based on maximum 4 in. eave width for single-section homes and maximum12 in. for multi-section homes.
5. Table is based on maximum 20-degree roof pitch (4.3/12).
6. Interpolation may be required for other heights from ground to strap attachment. The minimum height from the ground to the bottom of the floor joist must be 18 in.
7. Additional tiedowns may be required per the home manufacturer instructions.
8. Ground anchors must be certified for these conditions by a professional engineer, architect, or listed by a nationally recognized testing laboratory.
9. Ground anchors must be installed to their full depth, and stabilizer plates, if required by the ground anchor listing or certification, must be installed per the ground anchor and home manufacturer instructions.
10. Strapping and anchoring equipment must be certified by a registered professional engineer or registered architect, or listed by a nationally recognized testing agency to resist these specified forces in accordance with testing procedures in ASTM D 3953-97, *Standard Specification for Strapping, Flat Steel and Seals.*
11. A reduced ground anchor or strap working load capacity will require reduced tiedown strap and anchor spacing. Ground anchors must not be spaced closer than the minimum spacing permitted by the listing or certification.
12. Table is based on 3150 lb working load capacity, and straps must be placed within 2 ft of the ends of the home.
13. Table is based on minimum angle of 30 degrees between the diagonal strap and the ground.

Table 4.1 – Maximum Diagonal Tiedown Strap Spacing, Wind Zone I.

| Nominal Floor Width, Single Section/Multi-section | Max. Height from Ground to Diagonal Strap Attachment | I-Beam Spacing (82.5 in. max.) | I-Beam Spacing (99.5 in. max.) |
|---|---|---|---|
| 12/24 ft. 132 in. to 155 in. section(s) | 25 in. | 14 ft. 2 in. | 9 ft. 9 in. |
| | 33 in. | 11 ft. 9 in. | 7 ft. 8 in. |
| | 46 in. | 9 ft. 1 in. | 5 ft. 8 in. |
| | 67 in. | 6 ft. 6 in. | 4 ft. 0 in. |
| 14/28 ft. 156 in. to 179 in. section(s) | 25 in. | 18 ft. 2 in. | 15 ft. 11 in. |
| | 33 in. | 16 ft. 1 in. | 13 ft. 6 in. |
| | 46 in. | 13 ft. 3 in. | 10 ft. 8 in. |
| | 67 in. | 10 ft. 0 in. | 7 ft. 9 in. |
| 16/32 ft. 180 in. to 204 in. section(s) | 25 in. | 20 ft. 7 in. | 19 ft. 5 in. |
| | 33 in. | 19 ft. 0 in. | 17 ft. 5 in. |
| | 46 in. | 16 ft. 5 in. | 14 ft. 7 in. |
| | 67 in. | 13 ft. 1 in. | 11 ft. 3 in. |

Notes:

1. Table is based on maximum 90 in. sidewall height.
2. Table is based on maximum 4 in. inset for ground anchor head from edge of floor or wall.
3. Table is based on main rail (I-beam) spacing per given column.
4. Table is based on maximum 4 in eave width for single-section homes and maximum 12 in. for multi-section homes.
5. Table is based on maximum 20-degree roof pitch (4.3/12).
6. Interpolation may be required for other heights from ground to strap attachment. The minimum height from the ground to the bottom of the floor joist must by 18 in.
7. Additional tiedowns may be required per the home manufacturer instructions.
8. Ground anchors must be certified for these conditions by a professional engineer, architect, or listed by a nationally recognized testing laboratory.
9. Ground anchors must be installed to their full depth, and stabilizer plates, if required by the ground anchor listing or certification, must be installed per the ground anchor and home manufacturer instructions.
10. Strapping and anchoring equipment must be certified by a registered professional engineer or registered architect, or listed by a nationally recognized testing agency to resist these specified forces in accordance with testing procedures in ASTM D 3953-97, *Standard Specification for Strapping, Flat Steel and Seals.*
11. A reduced ground anchor or strap working load capacity will require reduced tiedown strap and anchor spacing. Ground anchors must not be spaced closer than the minimum spacing permitted by the listing or certification.
12. Table is based on 3150 lb. working load capacity, and straps must be placed within 2 ft. of the ends of the home.
13. Table is based on minimum angle of 30 degrees between the diagonal strap and the ground.

(C) Sidewall, over-the-roof, mate-line, and shear wall straps.

If sidewall, over-the roof, mate-line, or shear wall straps are installed on the home, they shall be connected to an anchoring assembly.

(D) Severe climatic conditions.

In frost-susceptible soil locations, ground anchor augers shall be installed below the frost line unless the foundation system is frost protected to prevent the effects of frost heave in accordance with acceptable engineering practice and rule ~~4781-6-02.3~~4781-6-03.3 of the Administrative Code.

(E) Flood hazard areas.

In flood hazard areas, the piers, anchoring, and support systems shall comply with FEMA 85 requirements and shall be capable of resisting all loads associated with design flood and wind events or combined flood

and wind events. See rule ~~4781-6-02.1~~4781-6-03.1 of the Administrative Code. In manufactured home parks, manufactured homes shall be installed in accordance with Chapter 4781. of the ~~Administrative~~Revised Code.

Effective: 1/20/2020

Five Year Review (FYR) Dates: 8/27/2019 and 01/20/2025

CERTIFIED ELECTRONICALLY

Certification

11/04/2019

Date

Promulgated Under: 119.03
Statutory Authority: 4781.04, 4781.14
Rule Amplifies: 4781.04, 4781.14
Prior Effective Dates: 01/01/2010, 12/01/2012