4781-6-03.3 Foundations.

(A) General.

(1) Foundations for manufactured home installations shall be designed and constructed in accordance with this subpart and shall be based on site conditions, home design features, and the loads the home was designed to withstand as shown on the home's data plate.

(2) Foundation systems that are not pier and footing type configurations may be used when verified by engineering data and designed in accordance with this rule and consistent with the design loads of the MHCSS. Pier and footing specifications~~,~~ that are different than those provided in this rule, such as block size, metal piers, section width, loads, and spacing, may be used when verified by engineering data that comply with this rule and are capable of resisting all design loads of the MHCSS.

(3) Details, plans, and test data shall be designed and certified by an Ohio registered professional engineer or registered architect, and shall not take the home out of compliance with the MHCSS.

(4) Alternative foundation systems. Alternative foundation systems or designs are permitted when they do not take the home out of compliance with the MHCSS and when they are in accordance with either of the following:

(a) Engineered foundation systems or designs shall be manufactured and installed in accordance with their listings by a nationally recognized testing agency based on a nationally recognized testing protocol; or

(b) System designs shall be prepared by an Ohio registered professional engineer or a registered architect in accordance with acceptable engineering practice.

(B) Flood hazard areas.

(1) In flood hazard areas, the foundation, anchoring, and support systems shall be capable of resisting loads associated with design flood and wind events, and homes shall be installed on foundation supports that are designed and anchored to prevent ~~floatation~~flotation, collapse, or lateral movement of the structure. The manufactured home shall be installed in accordance with the manufacturer's instructions where available. If the foundation system being used is not covered by the manufacturer's instructions, the foundation system shall be designed by an Ohio registered professional engineer or registered architect.

(2) Where manufacturer's installation instructions do not address flood loads or flood hazard areas, the requirements of the authority having jurisdiction, the floodplain authority, FEMA 85, 44 C.F.R. 60.3(a) to (e) ~~(Feb. 8, 1984)~~, other provisions of 44 ~~C.F.R.60~~C.F.R. 60 referenced by those paragraphs, Chapter 1521. of the Revised Code, and ~~division~~Chapter 1501:22-1 of the Administrative Code shall govern.

(C) Piers.

(1) General. The piers used shall be capable of transmitting the vertical live and dead loads to the footings or foundation.

(2) Acceptable piers, materials ~~specifitication~~specification.

(a) Piers are permitted to be concrete blocks; hardwood or other listed and approved shims, spacers, or caps, or with pressure-treated wood shims, spacers, or caps with a water borne preservative, in accordance with the American wood ~~preserver's~~protection association's (AWPA) "Standard U1 for Use Category 4B" ground contact applications; or adjustable metal or concrete piers.

(b) Manufactured piers shall be listed or labeled for the required vertical load capacity, and, where required by design, for the appropriate horizontal load capacity. Manufactured piers shall be installed with an approved footing and in accordance with their listing or pier manufacturer's installation instructions.

(3) Design requirements.

(a) Load bearing capacity. The load bearing capacity for each pier shall be designed to ~~included~~include consideration for the dimensions of the home, the design dead and live loads, the spacing of the piers, and the way the piers are used to support the home.

(b) Center beam/mating wall support shall be required for multi-section homes, and designs shall be consistent with tables 3.2 and 3.3 of this rule and figures 3E, 3F, and 3G of this rule.

(4) Pier loads.

(a) Design support configurations and footing sizes for the pier loads, pier spacing, and roof live loads shall be in accordance with tables 3.1, 3.2, and 3.3 and the MHCSS. Other pier and footing designs are permitted in accordance with the provisions of Chapter 4781. of the Revised Code.

Table 3.1 – Frame Blocking Only/Perimeter Support Not Required At Openings

Pier Spacing	Roof Live Load (psf)	Location	Load (lb)
4 ft 0 in.	20	Frame	2900
	30	Frame	3300
	40	Frame	3600
6 ft 0 in.	20	Frame	4200
	30	Frame	4700
	40	Frame	5200
8 ft 0 in.	20	Frame	5500
	30	Frame	6200
	40	Frame	6900
10 ft 0 in.	20	Frame	6800
	30	Frame	7600
	40	Frame	8500

Notes:

1. See 4781-6-02.3(2)(e) and (f) for cast-in-place footing design using the noted loads.
2. Table 3.1 is based on the following design assumptions: maximum 16 t. normal section width (15 ft actual width), 12" eave, 10" I-beam size, 300 lb. pier dead load, 10 psf roof dead load, 6 psf floor dead load, 35 plf wall dead load, and 10 plf chassis dead load.
3. Interpolation for other pier spacing is permitted.
4. The pier spacing and loads shown in the above Table do not consider flood or seismic loads and are not intended for use in flood or seismic hazard areas. In those areas, the foundation support system is to be designed by a professional engineer or architect.

Commented [ED1]: This chart is being updated for citation purposes, see chart below.

Table 3.1 – Frame Blocking Only/Perimeter Support Not Required At Openings

Pier Spacing	Roof Live Load (psf)	Location	Load (lb.)
4 ft. 0 in.	20	Frame	2900
	30	Frame	3300
	40	Frame	3600
6 ft. 0 in.	20	Frame	4200
	30	Frame	4700
	40	Frame	5200
8 ft. 0 in.	20	Frame	5500
	30	Frame	6200
	40	Frame	6900
10 ft. 0 in.	20	Frame	6800
	30	Frame	7600
	40	Frame	8500

Notes:

1. See 4781-6-03.3(2)(e) and (f) for cast-in-place footing design using the noted loads.
2. Table 3.1 is based on the following design assumptions: maximum 16 t. normal section width (15 ft. actual width), 12" eave, 10" I-beam size, 300 lb. pier dead load, 10 psf roof dead load, 6 psf floor dead load, 35 plf wall dead load, and 10 plf chassis dead load.
3. Interpolation for other pier spacing is permitted.
4. The pier spacing and loads shown in the above Table do not consider flood or seismic loads and are not intended for use in flood or seismic hazard areas. In those areas, the foundation support system is to be designed by a professional engineer or architect.

Table 3.2 – Frame Plus Perimeter Blocking /Perimeter Support Not Required At Openings

Maximum Pier Spacing	Roof Live Load (psf)	Location	Load (lb)
4 ft 0 in.	20	Frame	1,400
		Perimeter	1,900
		Mating	3,200
	30	Frame	1,400
		Perimeter	2,300
		Mating	3,800
	40	Frame	1,400
		Perimeter	2,600
		Mating	4,400
6 ft 0 in.	20	Frame	1,900
		Perimeter	2,700
		Mating	4,700
	30	Frame	1,900
		Perimeter	3,200
		Mating	5,600
	40	Frame	1,900
		Perimeter	3,700
		Mating	6,500
8 ft 0 in.	20	Frame	2,400
		Perimeter	3,500
		Mating	6,100
	30	Frame	2,400
		Perimeter	4,200
		Mating	7,300
	40	Frame	2,400
		Perimeter	4,800
		Mating	8,500
10 ft 0 in.	20	Frame	2,900
		Perimeter	4,300
		Mating	7,600
	30	Frame	2,900
		Perimeter	5,100
		Mating	9,100
	40	Frame	2,900
		Perimeter	6,000
		Mating	10,600

Notes for Table 3.2:

1. See 4781-6-02.3(2)(e) and (f) for cast-in-place footing design by using the noted loads.
2. Mating wall perimeter piers and footings only required under full height mating walls supporting roof loads.
3. Table 3.2 is based on the following design assumptions: maximum 16 ft. normal section width (15 ft actual width), 12" eave, 10" I-beam size, 300 lb. pier dead load, 10 psf roof dead load, 6 psf floor dead load, 35 plf wall dead load, and 10 plf chassis dead load.
4. Interpolation for other pier spacing is permitted.
5. The pier spacing and loads shown in the above Table do not consider flood or seismic loads and are not intended for use in flood or seismic hazard areas. In those areas, the foundation support system is to be designed by an Ohio registered professional engineer or architect.

Commented [ED2]: This chart is being updated for citation purposes, see chart below.

Table 3.2 – Frame Plus Perimeter Blocking/Perimeter Support Not Required at Openings

Maximum Pier Spacing	Roof Live Load (psf)	Location	Load (lb)
4 ft. 0 in.	20	Frame	1,400
		Perimeter	1,900
		Mating	3,200
	30	Frame	1,400
		Perimeter	2,300
		Mating	3,800
	40	Frame	1,400
		Perimeter	2,600
		Mating	4,400
6 ft. 0 in.	20	Frame	1,900
		Perimeter	2,700
		Mating	4,700
	30	Frame	1,900
		Perimeter	3,200
		Mating	5,600
	40	Frame	1,900
		Perimeter	3,700
		Mating	6,500

Maximum Pier Spacing	Roof Live Load (psf)	Location	Load (lb)
8 ft. 0 in.	20	Frame	2,400
		Perimeter	3,500
		Mating	6,100
	30	Frame	2,400
		Perimeter	4,200
		Mating	7,300
	40	Frame	2,400
		Perimeter	4,800
		Mating	8,500
10 ft. 0 in.	20	Frame	2,900
		Perimeter	4,300
		Mating	7,600
	30	Frame	2,900
		Perimeter	5,100
		Mating	9,100
	40	Frame	2,900
		Perimeter	6,000
		Mating	10,600

Notes for Table 3.2:

1. See 4781-6-03.3(2)(e) and (f) for cast-in-place footing design by using the noted loads.
2. Mating wall perimeter piers and footings only required under full height mating walls supporting roof load.
3. Table 3.2 is based on the following design assumptions: maximum 16 ft. normal section width (15 ft. actual width), 12" eave, 10" I-beam size, 300 lb. pier dead load, 10 psf roof dead load, 6 psf floor dead load, 35 plf wall dead load, and 10 plf chassis dead load.
4. Interpolation for other pier spacing is permitted.
5. The pier spacing and loads shown in the above Table do not consider flood or seismic loads and are not intended for use in flood or seismic hazards areas. In those areas, the foundation support system is to be designed by an Ohio registered professional engineer or architect.

Table 3.3 – Ridge Beam Span Footing Capacity

Mating Wall Opening (ft)	Roof Live Load (psf)	Pier and Footing Load (lb)
5	20	1,200
	30	1,600
	40	1,900
10	20	2,300
	30	3,100
	40	3,800
15	20	3,500
	30	4,700
	40	5,800
20	20	4,700
	30	6,200
	40	7,500
25	20	5,800
	30	7,800
	40	9,700
30	20	7,000
	30	9,300
	40	11,600
35	20	8,100
	30	10,900
	40	13,600

Notes:

1. See 4781-6-02.3(2)(e) and (f) for cast-in-place footing design by using the noted loads.
2. Table 3.3 is based on the following design assumptions: maximum 16 ft. normal section width (15 ft. actual width), 10" I-beam size, 300 lb. pier dead load, 10 psf roof dead load, 6 psf floor dead load, 35 plf wall dead load, and 10 plf chassis dead load.
3. Loads listed are maximum column loads for each section of the manufactured home.
4. Interpolation for maximum allowable pier and column loads is permitted for mate-line openings between those shown in the Table.
5. The pier spacing and loads shown in the above Table do not consider flood or seismic loads and are not intended for use in flood or seismic hazard areas. In those areas, the foundation support system must be designed by an Ohio registered professional engineer or registered architect.

Commented [ED3]: This chart is being updated for citation purposes, see chart below.

Table 3.3 – Ridge Beam Span Footing Capacity

Mating Wall Opening (ft)	Roof Live Load (psf)	Pier and Footing Load (lb)
5	20	1,200
	30	1,600
	40	1,900
10	20	2,300
	30	3,100
	40	3,800
15	20	3,500
	30	4,700
	40	5,800
20	20	4,700
	30	6,200
	40	7,500
25	20	5,800
	30	7,800
	40	9,700
30	20	7,000
	30	9,300
	40	11,600
35	20	8,100
	30	10,900
	40	13,600

Notes:

1. See 4781-6-03.3(2)(e) and (f) for cast-in-place footing design by using the noted loads.
2. Table 3.3 is based on the following design assumptions: maximum 16 ft. normal section width (15 ft. actual width), 10" I-beam size, 300 lb. pier dead load, 10 psf roof dead load, 6 psf floor dead load, 35 plf wall dead load, and 10 plf chassis dead load.
3. Loads listed are maximum column loads for each section of the manufactured home.
4. Interpolation for maximum allowable pier and column loads is permitted for mate-line openings between those shown in the Table.
5. The pier spacing and loads shown in the above Table do not consider flood or seismic loads and are not intended for use in flood or seismic hazard areas. In those areas, the foundation support system must be designed by an Ohio registered professional engineer or registered architect.

(b) Manufactured piers shall be rated at least to the loads required to safely support the dead and live loads as required by this rule and the installation instructions for those piers shall be consistent with tables 3.1, 3.2, and 3.3 of this rule.

(D) Pier configuration.

(1) Concrete blocks. Installation instructions for concrete block piers shall be developed in accordance with the following provisions and shall be consistent with figures 3A and 3B of this rule.

(a) Load-bearing concrete blocks meeting ASTM C-90 shall be used and shall have nominal dimensions of at least eight inches by eight inches by sixteen inches and an average net area minimum compressive strength for three units of nineteen hundred psi;

(b) The concrete blocks shall be stacked with their hollow cells aligned vertically; and

(c) When piers are constructed of blocks stacked side by side, each layer shall be at right angles to the preceding one, as shown in figure 3B of this rule.

(2) Caps.

(a) Structural loads shall be evenly distributed across capped hollow block piers, as shown in figures 3A and 3B of this rule.

(b) Caps shall be solid concrete or masonry at least four inches in nominal thickness, or hardwood lumber at least two inches nominal in thickness; or be corrosion-protected minimum one-half inch thick steel; or be of other listed materials. ACQ treated lumber shall not have direct contact with I-beams. Roofing felt, six mil plastic, or equal may be used as a barrier between ACQ caps and the I-beam.

(c) All caps shall be of the same length and width as the piers on which they rest.

(d) When split caps are used on double-stacked blocks, the caps shall be installed with the long dimension across the joint in the blocks below.

(3) Gaps. Any gaps that occur during installation between the main chassis beam and foundation support system shall be filled.

(a) Nominal four inch by six inch by one inch shims are permitted to be used to level the home and fill any gaps between the base of the main chassis beam and the top of the pier cap.

(b) Shims shall be used in pairs as shown in figures 3A and 3B of this rule and shall be driven in tightly so that they do not occupy more than one inch of vertical height.

(c) Hardwood plates no thicker than two inches nominal in thickness or four inches nominal concrete block must be used to fill any remaining vertical gaps.

(d) Gap fill materials, not made of masonry, shall not exceed three inches, by a combination of nominal two by eight wood block and one set of one-inch wood wedges or shims.

(4) Manufactured pier heights. Manufactured pier heights shall be selected so that the adjustable risers do not extend more than two inches when finally positioned.

(E) Clearance under homes.

(1) A minimum clearance of twelve inches shall be maintained between the lowest member of the main frame (I-beam or channel beam) and the grade under all areas of the home. No more than twenty-five per cent of the lowest member of the main frame of the home shall be less than eighteen inches above grade.

(2) A minimum clearance of eight inches shall be maintained between the bottom of the lowest wood frame member and the exterior grade.

(F) Design procedures for concrete block piers.

(1) Frame piers less than thirty-six inches high.

(a) Frame piers less than thirty-six inches high shall be permitted if constructed of single, open, or closed-cell concrete blocks, eight inches by eight inches by sixteen inches, when the design capacity of the block is not exceeded.

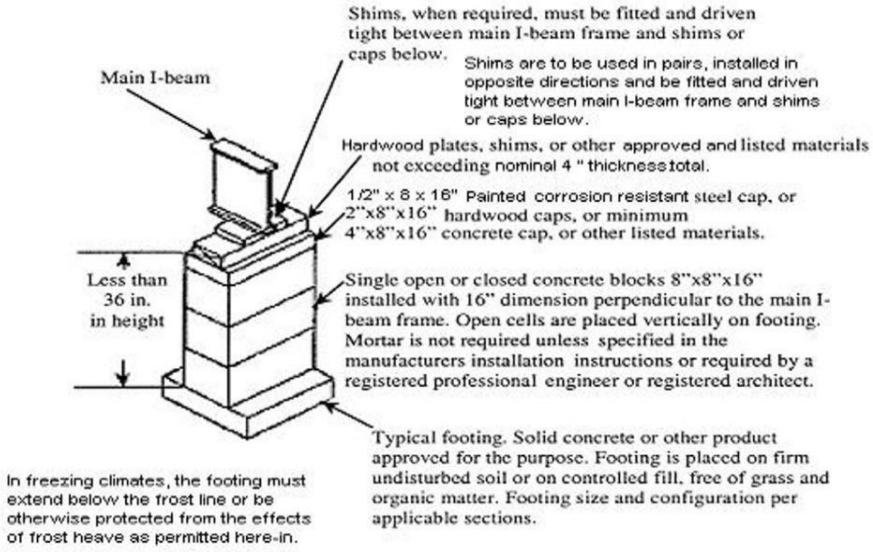
(b) The frame piers shall be installed so that the long sides are at right angles to the supported I-beam, as shown in figure 3A of this rule.

(c) The concrete blocks shall be stacked with their hollow cells aligned vertically and shall be positioned at right angles to the footings.

(d) Horizontal offsets from the top to the bottom of the pier shall not exceed one-half inch.

(e) Mortar is not required unless specified in the installation instructions or required by an Ohio registered professional engineer or registered architect. Where mortar is required, minimum type S mortar shall be used.

Figure 3 A - Typical Footing and Pier Installation, Single Concrete Block.



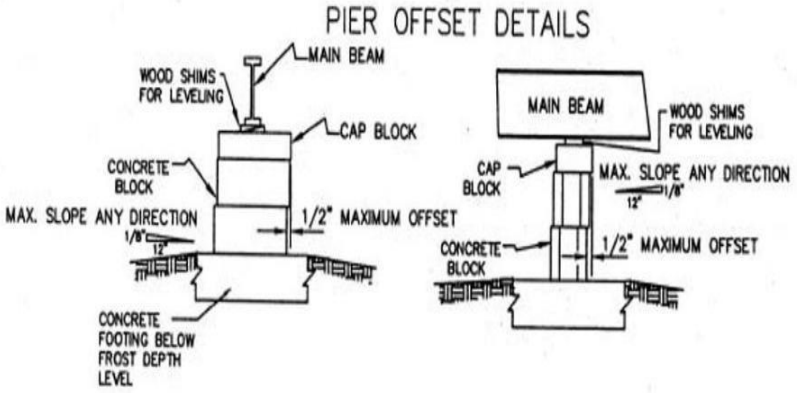
(2) Frame piers thirty-six inches to sixty-seven inches high and corner piers.

(a) All frame piers between thirty-six and sixty-seven inches high and corner piers over three blocks high shall be constructed out of double, interlocked concrete blocks as shown in figure 3B of this rule, when the design capacity of the block is not exceeded. Mortar is not required for concrete block piers unless otherwise specified in the installation instructions or required by an Ohio registered professional engineer or registered architect. Where mortar is required, minimum type S mortar shall be used.

(b) Horizontal offsets from the top to the bottom of the pier shall not exceed one-half inch.

(3) Pier tolerances. Piers shall be plumb and level with tolerances per figure 3D of this rule.

Figure 3D - Pier Offset Details

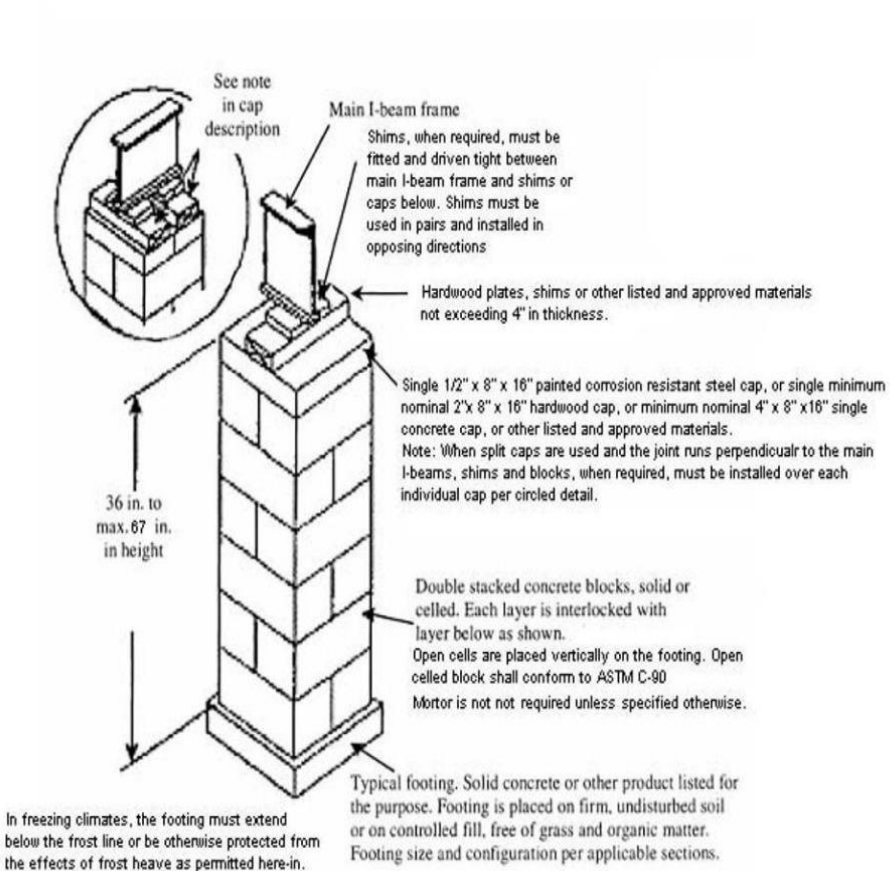


Notes:

1. Footing must be large enough to allow for full contact between the blocks and the footing.

2. All footings shall have a minimum thickness of 8" and must extend below the local frost line or have equivalent frost heave protection.

Figure 3B - Typical Footing and Pier Installation, Double Stack Concrete Block



(4) All piers over sixty-seven inches high. Unless the manufacturer's installation instructions specifically ~~contains~~contain a design, piers over sixty-seven inches high shall be designed by an Ohio registered professional engineer or registered architect in accordance with acceptable engineering practice. Mortar is not required for concrete block piers unless otherwise specified by the design. Where mortar is required, minimum type S mortar shall be used.

(G) Perimeter support piers.

(1) Piers required at mate-line supports, perimeter piers, and piers at exterior wall openings shall be permitted

to be constructed of single open-cell or closed-cell concrete blocks, with nominal dimensions of eight inches by eight inches by sixteen inches, to a maximum height of fifty-four inches, as shown in figure 3A of this rule, when the design capacity of the block is not exceeded.

(2) Piers used for perimeter support shall be installed with the long dimension parallel to the perimeter rail.

(H) Manufactured piers.

Manufactured piers shall be listed and labeled and installed to the pier manufacturer's installation instructions. See this rule for additional requirements.

(I) Piers over sixty-seven inches high.

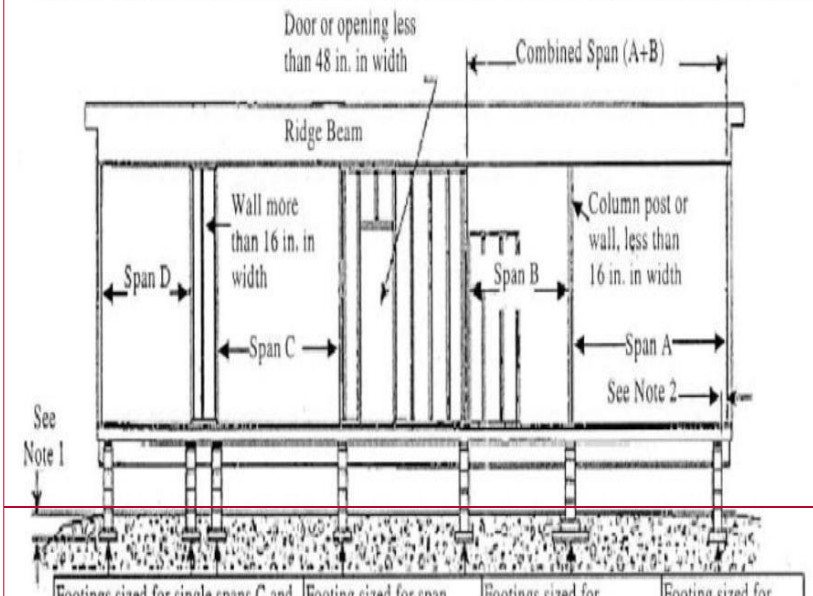
Piers over sixty-seven inches high must be designed by an Ohio registered professional engineer or registered architect, in accordance with acceptable engineering practice.

(J) Pier location and spacing.

(1) The location and spacing of piers depends upon the dimensions of the home, the live and dead loads, the type of construction (single- or multi-section), I-beam size, soil bearing capacity, footing size, and such other factors as the location of doors or other openings.

(2) Mate-line and column pier supports shall be in accordance with this rule and consistent with figures 3E to 3G of this rule.

Figure 3E - Typical Mate-line Column Pier and Mating Wall Support When Frame Only Blocking is Required.



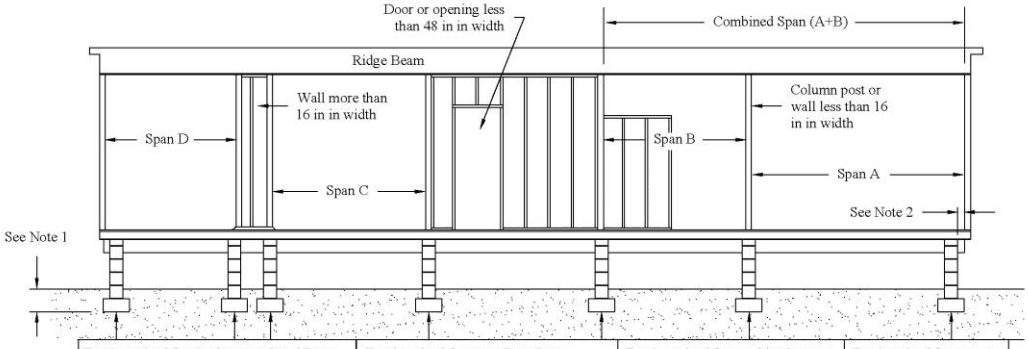
Footings sized for single spans C and D per Table 3.3 of 4781-6-02.3 [Note: If wall is less than 16in. in width, use combined span C + D, single pier]	Footing sized for span B or C, as applicable, per Table 3.3 of 4781-6-02. 3	Footings sized for combined spans A + B per Table 3.3 of 4781-6-02. 3	Footing sized for span A per Table 3.3 of 4781-6-02. 3

Notes

1. Bottom of footings must extend below frost line depth unless designed for placement above the frost line.
2. Piers may be offset up to 6" in either direction along the supported members to allow for plumbing, electrical, mechanical, equipment, crawlspace access, or other devices.
3. Single stack concrete block pier loads must not exceed 8,000 lbs.
4. Prefabricated piers must not exceed their approved or listed maximum vertical or horizontal design loads.
5. When a full-height mating wall does not support the ridge beam, this area is considered an unsupported span- span B
6. Piers are not required at openings in the mating wall that are less than 48" in width. Place piers on both sides of mating wall openings 48" or greater in width. For roof loads of 40psf or greater, an Ohio registered engineer or architect must determine the maximum mating wall openings permitted without pier or other supports.

Commented [ED4]: This chart is being updated for citation purposes, see chart below.

Figure 3E - Typical Mate-line Column Pier and Mating Wall support When Frame Only Blocking is Required

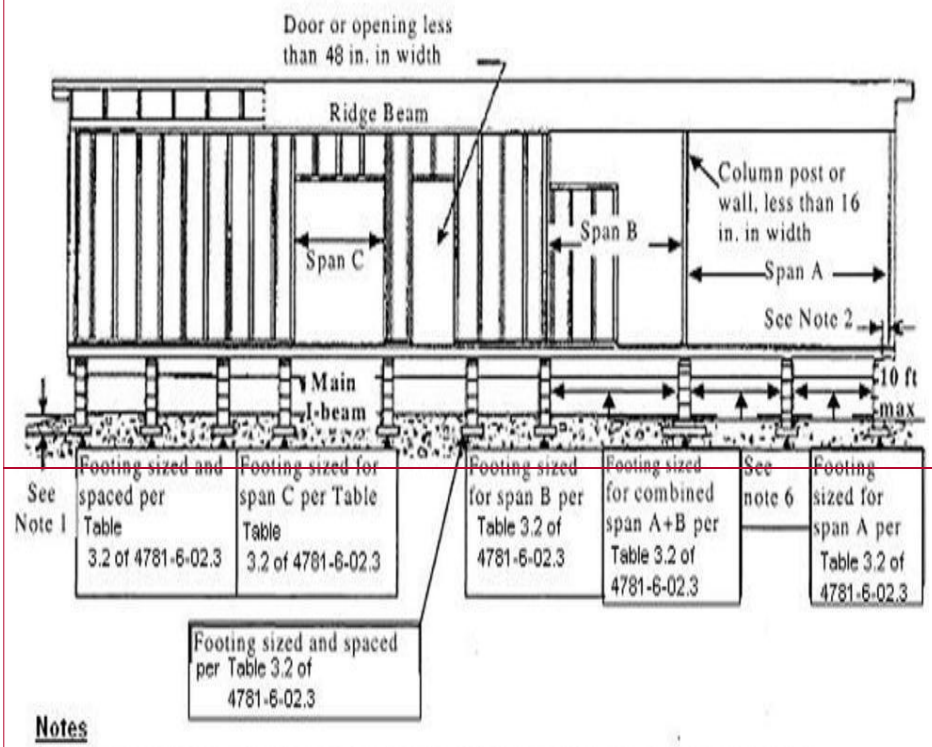


Footings sized for single spans C and D per Table 3.3 of 4781-6-03.3 [Note: If wall is less than 16 in. in width, use combined span C + D, single pier]	Footing sized for spans B or C, as applicable, per Table 3.3 of 4781-6-03.3	Footings sized for combined spans A + B per Table 3.3 of 4781-6-03.3	Footing sized for span A per Table 3.3 of 4781-6-03.3

Notes:

1. Bottom of footings must extend below frost line depth unless designed for placement above the frost line.
2. Piers may be offset up to 6" in either direction along the supported members to allow for plumbing, electrical, mechanical equipment, crawlspace access, or other devices.
3. Single stack concrete block pier loads must not exceed 8,000 lbs.
4. Prefabricated piers must not exceed their approved or listed maximum vertical or horizontal design loads.
5. When a full-height mating wall does not support the ridge beam, this area is considered an unsupported span-span B
6. Piers are not required at openings in the mating wall that are less than 48" in width. Place piers on both sides of mating wall openings 48" or greater in width. For roof loads of 40 psf or greater, an Ohio registered engineer or architect must determine the maximum mating wall openings permitted without pier or other supports.

Figure 3F- Typical Mate-line Column Pier and Mating Wall Support When Mate-line Blocking is Required.

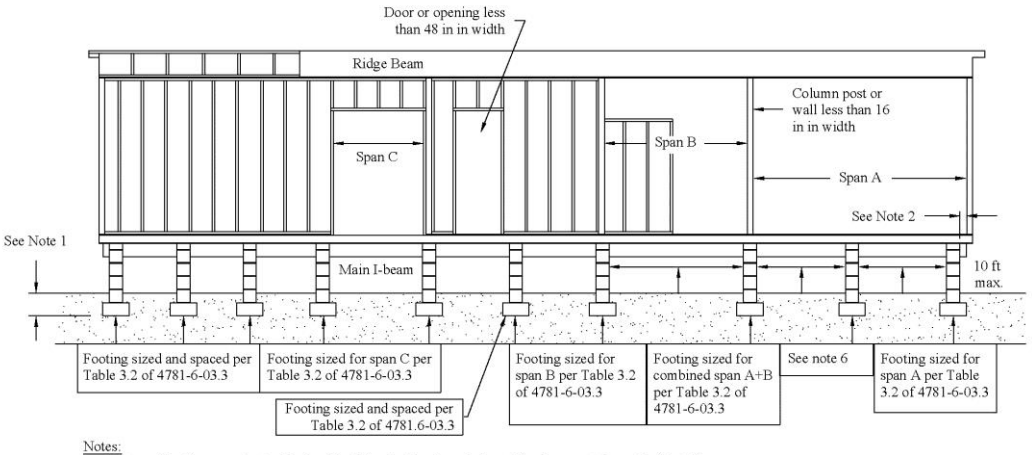


Notes

1. Bottom of footings must extend below frost line depth unless designed for placement above the frost line.
2. Piers may be offset up to 6" in either direction along the supported members to allow for plumbing, electrical, mechanical, equipment, crawlspace access, or other devices.
3. Single stack concrete block pier loads must not exceed 8,000 lbs.
4. Prefabricated piers must not exceed their approved or listed maximum vertical or horizontal design loads.
5. When a full-height mating wall does not support the ridge beam, this area is considered an unsupported span- span B
6. Piers are not required at openings in the mating wall that are less than 48" in width. Place piers on both sides of mating wall openings 48" or greater in width. For roof loads of 40psf or greater, an Ohio registered engineer or architect must determine the maximum mating wall openings permitted without pier or other supports.

Commented [ED5]: This chart is being updated for citation purposes, see chart below.

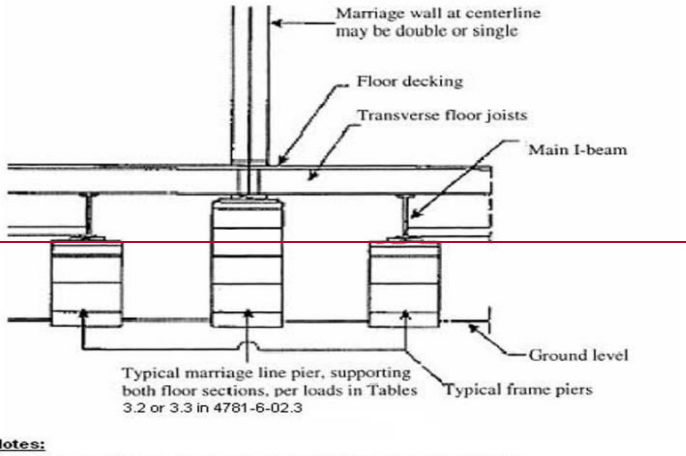
Figure 3F - Typical Mate-line Column Pier and Mating Wall support When Mate-line Blocking is Required



Notes:

1. Bottom of footings must extend below frost line depth unless designed for placement above the frost line.
2. Piers may be offset up to 6" in either direction along the supported members to allow for plumbing, electrical, mechanical equipment, crawlspace access, or other devices.
3. Single stack concrete block pier loads must not exceed 8,000 lbs.
4. Prefabricated piers must not exceed their approved or listed maximum vertical or horizontal design loads.
5. When a full-height mating wall does not support the ridge beam, this area is considered an unsupported span-span B
6. Piers are not required at openings in the mating wall that are less than 48" in width. Place piers on both sides of mating wall openings 48" or greater in width. For roof loads of 40 psf or greater, an Ohio registered engineer or architect must determine the maximum mating wall openings permitted without pier or other supports.

Figure 3G - Typical Mate-line Column Pier and Mating Wall Support When Perimeter Blocking is Required

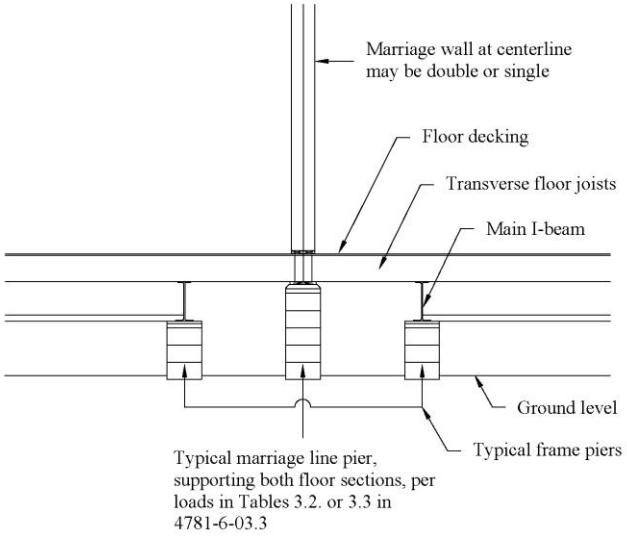


Notes:

1. Mate-line column support piers are installed with the long dimension of the concrete block perpendicular to the rim joists.
2. Pier and footing designed to support both floor sections. Loads as listed in Table 3.3 of 4781-6-02.3 are total column loads for both sections.

Commented [ED6]: This chart is being updated for citation purposes, see chart below.

Figure 3G - Typical Mate-line Column Pier and Mating Wall support When Perimeter Blocking is Required



Notes:
1. Mate-line column support piers are installed with the long dimension of the concrete block perpendicular to the rim joists
2. Pier and footing designed to support both floor sections. Loads as listed in Table 3.3 of 4781-6-03.3 are total column loads for both sections.

(3) Piers supporting the frame shall be no more than twenty-four inches from both ends and not more than ninety-six inches from center to center under the main rails. If the piers supporting the frame is more than ninety-six inches, but not more than one hundred twenty inches, from the center to center under the main rails, the increased dimensions shall be approved by an Ohio professional engineer or registered architect or in accordance with the ~~manufactured~~manufacturer's installation manual.

(4) Pier support locations. Pier support locations and spacing shall be presented to be consistent with figures 3H and 3I of this rule, as applicable, unless alternative designs are provided by a professional engineer or registered architect in accordance with acceptable engineering practice.

(K) Required perimeter supports. Perimeter pier or other supports shall be located as follows:

(1) On both sides of side wall exterior doors (such as entry, patio, and sliding glass doors) and any other side wall openings of forty-eight inches or greater in width, and under load-bearing porch posts, factory installed fireplaces, and wood stoves.

(2) Other ~~permiter~~perimeter supports shall be:

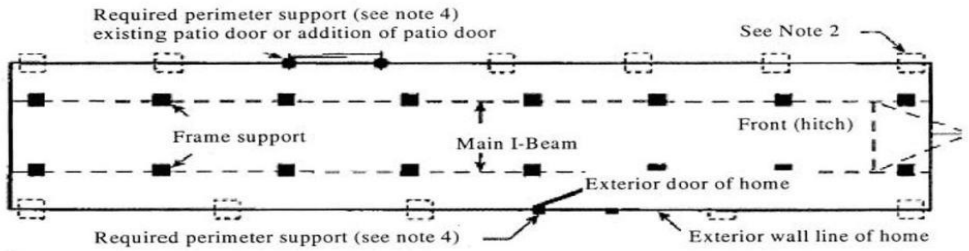
(a) Located in accordance with table 3.2 of this rule.

(b) Provided by other means such as additional outriggers or floor joists. When this alternative is used, the designs required by this rule shall consider the additional loads in sizing the pier and footing supports under the main chassis beam.

(L) Footings.

(1) Materials approved for footings shall provide equal load-bearing capacity and resistance to decay as required by this rule. Footings shall be placed on undisturbed soil or fill compacted to ninety per cent of maximum relative density. A footing shall support every pier.

Figure 3H - Typical Blocking diagram for Single Section Homes



Notes:

1. Refer to Table 3.2 of 4781-6-2.3 for pier and footing requirements when frame blocking only is used.

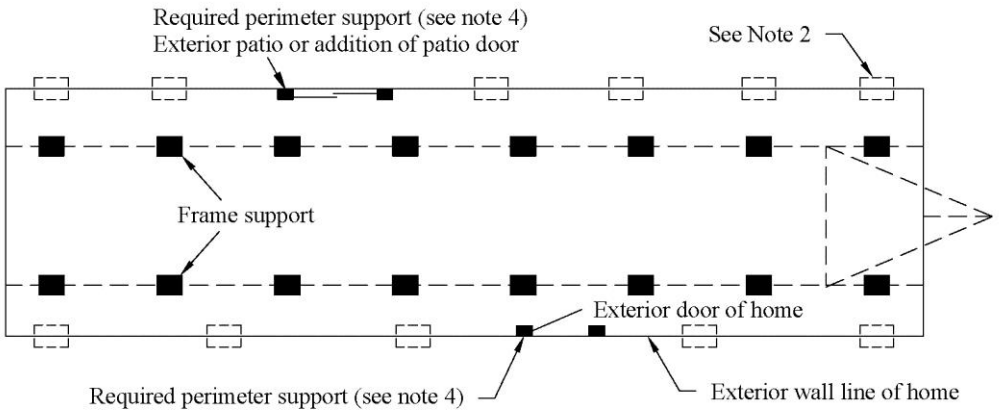
2. In addition to blocking required by 4781-6-02.3(K) refer to Table 3.2 of 4781-6-2.3

3. End piers under main I-beams may be set back a maximum of 24 in. as measured from the outside edge of the floor to the center of the pier.

4. Place piers on both sides of sidewall exterior doors, patio doors, and sliding glass doors; under porch posts, factory installed masonry fireplaces and wood stoves; under jamb studs at multiple window openings; and at any other sidewall openings 48" or greater in width. See 4781-6-2.3 for additional requirements and for locating perimeter supports.

Commented [ED7]: This chart is being updated for citation purposes, see chart below.

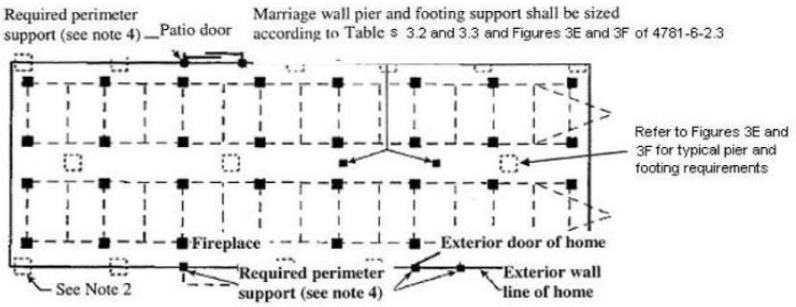
Figure 3H - Typical Blocking diagram for Single Section Homes



Notes:

1. Refer to Table 3.2 of 4781-6-03.3 for pier and footing requirements when frame blocking only is used.
2. In addition to blocking required by 4781-6-03.3 (K) per table 3.2 of 4781-6-03.3
3. End piers under main I-beam may be set back a maximum 24 in. as measured from the outside edge of the floor to the center of the pier.
4. Place piers on both sides of sidewall exterior doors, patio doors, and sliding glass doors; under porch posts, factory installed masonry fireplaces and wood stoves; under jamb studs at multiple window openings; and at any other sidewall openings 48" or greater in width. See 4781-6-03.3 for additional requirements and for locating perimeter supports.

Figure 3I - Typical Blocking Diagram for Multi-section Home.

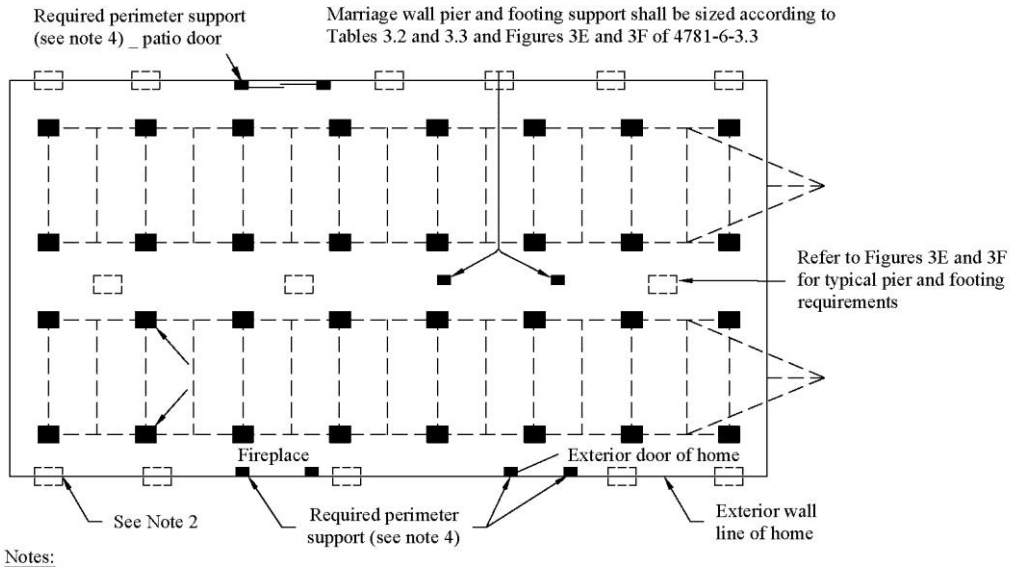


Notes:

1. Refer to Table 3.1 for pier and footing requirements when frame blocking only is used.
2. In addition to blocking required by 4781-6-2.3 refer to Table s 3.2 and 3.3 of 4781-6-2.3
3. End piers under main I-beams may be set back a maximum of 24 in. as measured from the outside edge of the floor to the center of the pier.
4. Place piers on both sides of sidewall exterior doors, patio doors, and sliding glass doors; under porch posts, factory-installed masonry fireplaces, and wood stoves; under jamb studs at multiple window openings; and at any other sidewall openings of 48 inches or greater in width. See 4781-6-2.3 for additional information on requirements for locating perimeter supports.
5. When an end pier under the mate-line also serves as a column pier, it may be set back a maximum of 6 in. as measured from the inside edge of the exterior wall to the center of the pier.

Commented [ED8]: This chart is being updated for citation purposes, see chart below.

Figure 3I - Typical Blocking Diagram for Multi-section Homes



Notes:

1. Refer to Table 3.1 for pier and footing requirements when frame blocking only is used.
2. In addition to blocking required by 4781-6-03.3 per Tables 3.2 and 3.3 of 4781-6-03.3
3. End piers under main I-beam may be set back a maximum 24 in. as measured from the outside edge of the floor to the center of the pier.
4. Place piers on both sides of sidewall exterior doors, patio doors, and sliding glass doors; under porch posts, factory installed masonry fireplaces and wood stoves; under jamb studs at multiple window openings; and at any other sidewall openings 48" or greater in width. See 4781-6-03.3 for additional requirements and for locating perimeter supports.
5. When an end pier under the mate-line also serves as a column pier, it may be setback a maximum of 6 in. as measured from the inside edge of the exterior wall to the center of the pier.

(2) Acceptable types of footings.

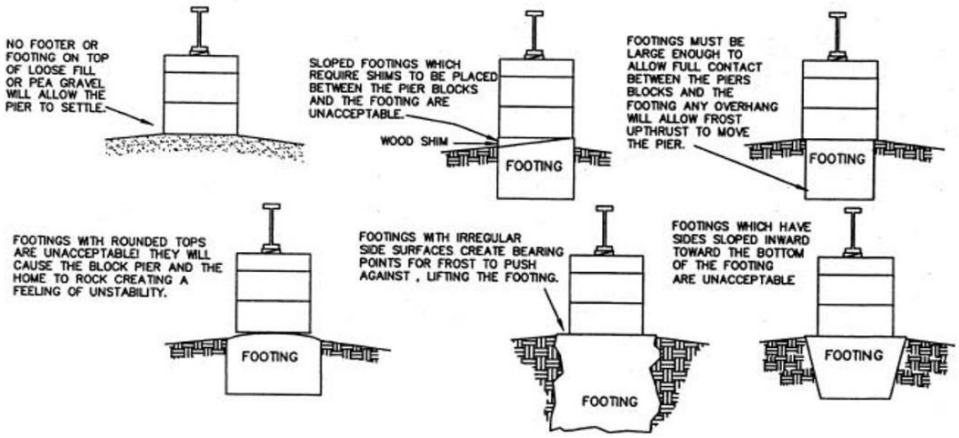
(a) Concrete. Footings are to be either:

(i) Four inch nominal precast concrete pads meeting or exceeding "ASTM C ~~90-02~~90, Standard Specification for Load Bearing Concrete Masonry Units," without reinforcement, with at least a twenty-eight day compressive strength of three thousand pounds per square inch (psi);

(ii) Six inch minimum poured-in-place concrete pads, slabs, or ribbons with at least a twenty-eight day compressive strength of three thousand pounds per square inch (psi). Cast-in-place concrete footings may also require reinforcing steel based on acceptable engineering practice, the design loads, and site specific soil conditions. Poured footings shall be level and screeded smooth; or

(iii) Footing tolerances. Improper footings as illustrated in figure 3J shall not be approved.

Figure 3J - Improper Footing Details



(b) Engineered plastic composite footing pads.

(i) Engineered plastic composite footing pads shall be permitted if used in accordance with the manufacturer's installation instructions and/or specification sheet of the specific engineered plastic composite pad being used. The use of engineered plastic composite pads must be used in conjunction with solid perimeter skirting in accordance with paragraphs (D)(1) to (D)(4) and (E)(1) to (E)(6) of rule ~~4781-6-02.5~~4781-6-03.5 of the Administrative Code.

(ii) Engineered plastic composite footing pads shall be listed or labeled for the required load capacity and installed in accordance with their listing.

(c) Placement in freezing climates. Footings placed in freezing climates shall be designed using methods and practices that prevent the effects of frost heave by one of the following methods:

(i) Conventional footings shall be placed below the frost line depth for the site unless an insulated foundation or monolithic slab is used in this rule. When the frost line depth is not available from the authority having jurisdiction, a registered professional engineer, registered architect, or

registered geologist shall be consulted to determine the required frost line depth for the manufactured home site.

(ii) Monolithic slab systems. A monolithic slab may be permitted above the frost line when all relevant site-specific conditions including soil characteristics, site preparation, ventilation, and insulative properties of the under floor enclosure are considered and anchorage requirements as set for in rule ~~4781-6-02.4~~4781-6-03.4 of the Administrative Code, and the monolithic slab system shall be designed by an Ohio registered professional engineer or registered architect:

(a) In accordance with acceptable engineering practice to prevent the effects of frost heave; or

(b) In accordance with ASCE/SEI 32-01. The design shall accommodate the anchorage requirements set out in rule ~~4781-6-02.4~~4781-6-03.4 of the Administrative Code.

(iii) Insulated foundations. An insulated foundation shall be permitted above the frost line, when all relevant site-specific conditions including soil characteristics, site preparation, ventilation, and insulative properties of the under floor enclosure are considered and the foundation is designed by an Ohio registered professional engineer or registered architect:

(a) In accordance with acceptable engineering practice to prevent the effects of frost heave; or

(b) In accordance with ASCE/SEI 32-01. The design shall accommodate the anchorage requirements set out in rule ~~4781-6-02.4~~4781-6-03.4 of the Administrative Code.

(d) Sizing of footings. The sizing of footings depends on the load-bearing capacity of the soil, footings, and the piers as set forth in this rule.

(e) The size and capacity for un-reinforced cast-in-place footings shall be in accordance with figure 3K of this rule.

Figure 3K – The Size and Capacity for Un-reinforced Cast-in-Place Footings

		8 in. x 16 in. Pier		16 in. x 16 in. Pier	
Soil Capacity (psf)	Minimum Footing Size (in.)	Maximum Footing Capacity (lb.)	Unreinforced Cast-in-Place Minimum Thickness (in.)	Maximum Footing Capacity (lb.)	Unreinforced Cast-in-Place Minimum Thickness (in.)
1,000	16 x 16	1,600	6	1,600	6
	20 x 20	2,600	6	2,600	6
	24 x 24	3,700	6	3,700	6
	30 x 30	5,600	8	5,800	6
	36 x 36	7,900	10	8,100	8
	42 x 42	10,100[4]	12	13,600	12
	48 x 48	13,000[4]	15	13,600	12
1,500	16 x 16	2,500	6	2,500	6
	20 x 20	4,000	6	4,000	6
	24 x 24	5,600	8	5,700	6
	30 x 30	8,600[4]	10	8,900	6
	36 x 36	12,200d	12	12,600	8
	42 x 42	16,100[4]	15	16,500[4]	12
	48 x 48	20,400[4]	18	21,000[4]	15
2,000	16 x 16	3,400	6	3,400	6
	20 x 20	5,300	6	5,300	6
	24 x 24	7,600	8	7,700	6
	30 x 30	11,600[4]	10	11,900	8
	36 x 36	16,300[4]	15	16,900[4]	10
	42 x 42	21,700[4]	18	22,700[4]	12

Commented [ED9]: This chart is being updated to correct formatting issues, see chart below.

2,500	16 x 16	4,300	6	4,300	6
	20 x 20	6,700	6	6,700	6
	24 x 24	9,600[4]	8	9,700	6
	30 x 30	14,700[4]	12	15,000	8
	36 x 36	20,800[4]	15	21,400[4]	10
3,000	16 x 16	5,200	6	5,200	6
	20 x 20	8,100[4]	8	8,100	6
	24 x 24	11,500[4]	10	11,700	6
	30 x 30	17,800[4]	12	18,100[4]	8
	36 x 36	25,000[4]	18	18,100[4]	8
4,000	16 x 16	7,000	6	7,000	6
	20 x 20	10,800	8	10,900	6
	24 x 24	15,500[4]	10	15,600	8
	30 x 30	23,800[4]	15	24,200[4]	10

Notes:

1. The footing sizes shown are for square pads and are based on the area (in.^{2}), shear, and bending required for the loads shown. Other configurations, such as rectangular or circular configurations, can be used, provided the area and depth is equal to or greater than the area and depth of the square footing shown in the table, and the distance from the edge of the pier to the edge of the footing not less 3" or more than the thickness of the footing.
2. The 6 in. cast-in-place values can be used for 4 in. unreinforced precast concrete footings.
3. The capacity values listed have been reduced by the dead load of the concrete footing.
4. Concrete block piers must not exceed their design capacity.

Commented [ED10]: This chart is being updated to correct formatting issues, see chart below.

Figure 3K – The Size and Capacity for Un-reinforced Cast-in-Place Footings

		8 in. x 16 in. Pier		16 in. x 16 in. Pier	
Soil Capacity (psf)	Minimum Footing Size (in.)	Maximum Footing Capacity (lb.)	Unreinforced Cast-in-Place Minimum Thickness (in.)	Maximum Footing Capacity (lb.)	Unreinforced Cast-in-Place Minimum Thickness (in.)
1,000	16 x 16	1,600	6	1,600	6
	20 x 20	2,600	6	2,600	6
	24 x 24	3,700	6	3,700	6
	30 x 30	5,600	8	5,800	6
	36 x 36	7,900	10	8,100	8
	42 x 42	10,100[4]	12	13,600	12
	48 x 48	13,000[4]	15	13,600	12
1,500	16 x 16	2,500	6	2,500	6
	20 x 20	4,000	6	4,000	6
	24 x 24	5,600	8	5,700	6
	30 x 30	8,600[4]	10	8,900	6
	36 x 36	12,200d	12	12,600	8
	42 x 42	16,100[4]	15	16,500[4]	12
	48 x 48	20,400[4]	18	21,000[4]	15
2,000	16 x 16	3,400	6	3,400	6
	20 x 20	5,300	6	5,300	6
	24 x 24	7,600	8	7,700	6
	30 x 30	11,600[4]	10	11,900	8
	36 x 36	16,300[4]	15	16,900[4]	10
	42 x 42	21,700[4]	18	22,700[4]	12
2,500	16 x 16	4,300	6	4,300	6
	20 x 20	6,700	6	6,700	6
	24 x 24	9,600[4]	8	9,700	6
	30 x 30	14,700[4]	12	15,000	8
	36 x 36	20,800[4]	15	21,400[4]	10
3,000	16 x 16	5,200	6	5,200	6
	20 x 20	8,100[4]	8	8,100	6
	24 x 24	11,500[4]	10	11,700	6
	30 x 30	17,800[4]	12	18,100[4]	8
	36 x 36	25,000[4]	18	18,100[4]	8
4,000	16 x 16	7,000	6	7,000	6
	20 x 20	10,800	8	10,900	6
	24 x 24	15,500[4]	10	15,600	8
	30 x 30	23,800[4]	15	24,200[4]	10

Notes:

1. The footing sizes shown are for square pads and are based on the area (in.^{2}), shear, and bending required for the loads shown. Other configurations, such as rectangular or circular configurations, can be used, provided the area and depth is equal to or greater than the area and depth of the square footing shown in the table, and the distance from the edge of the pier to the edge of the footing not less 3" or more than the thickness of the footing.
2. The 6 in. cast-in-place values can be used for 4 in. unreinforced precast concrete footings.
3. The capacity values listed have been reduced by the dead load of the concrete footing.
4. Concrete block piers must not exceed their design capacity.

(M) Combination systems.

Support systems that combine both load-bearing capacity shall also be sized and designed for all applicable design loads.

(N) Permanent foundations.

Permanent foundations shall:

(1) Have a continuous perimeter wall that complies with the requirements of HUD's September 1996 permanent foundation guide for manufactured homes;

(2) Have footings that are either below the frost line or protected from frost heave;

(3) Tongue wheels, axles, and hitches shall be removed from under the manufactured home; and

(4) Conform to Chapter 4781-6 of the Administrative Code.

(O) Stable foundation means:

Foundations not to frost depth but protected against frost heave by the installation properties of the under home enclosure and shall conform to Chapter 4781-6 of the Administrative Code.

(P) Temporary foundation means:

Footing not below ~~frostline~~frost line or protected from frost heave and shall be permitted on private property for no more than six months~~,~~. ~~two~~Two six-month extensions may be granted by the authority having jurisdiction upon written request if the ~~installations~~installation is in accordance with Chapter 4781-6 of the Administrative Code.

(Q) Special snow load conditions.

(1) In general, foundations for homes, ~~which~~that by special request of the home-owner are designed for and located in areas with roof live loads greater than forty pounds per square foot shall be designed by the manufacturer for the special snow load conditions in accordance with acceptable engineering practice. Where site or other conditions prohibit the use of the manufacturer's instructions, a registered professional engineer or registered architect shall design the foundation for the special snow load conditions.

(2) Ramadas. ~~A ramada is any freestanding roof or shade structure, installed or erected above a manufactured home or any portion thereof.~~ Ramadas may be used and shall be self- supporting except that any connection to the home shall be for weatherproofing only.

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: 09/15/2006, 01/01/2010, 06/02/2011, 12/01/2012