

PORCH 3 & 4 SEASON

RESIDENTIAL
BUILDING INSPECTIONS DEPARTMENT
www.ci.blaine.mn.us



This handout is intended only as a guide and is based in part on the 2015 Minnesota State Building Code; City of Blaine, ordinances; and good building practice. While every attempt has been made to insure the correctness of this handout, no guarantees are made to its accuracy or completeness. Responsibility for compliance with applicable codes and ordinances falls on the owner or contractor. For specific questions regarding code requirements, refer to the applicable codes or contact your local Building Department.

GENERAL CAUTIONS REGARDING PORCH CONSTRUCTION

If you are considering constructing an enclosed porch, on an existing deck, please be aware that you will likely need to make significant alterations to the framing and supports of your deck in order to support the additional weight of a porch unless your deck was originally designed for that purpose. If you are constructing your porch from scratch, you may be able to design your porch without those concerns.

It is common practice to use “concrete piers” or “post footings” to support enclosed porches. Be aware that these types of foundations are a significant compromise compared to continuous perimeter foundations. Pier foundations are more susceptible to independent movement that can result in shifting of the porch resulting in cracked or jammed windows and doors and cracked wall finishes. Also, piers are usually sized just large enough to support anticipated loads based on average soil conditions leaving little safety factor. If your home is located in an area with clay or unpredictable soils, you may wish to consult with a soils engineer to aid in designing your foundation. See the City of Blaine handout, **FROST HEAVE PIER FOOTINGS**, for more detailed information.

Once porches are in place, homeowners with porches attached to homes with walkout basements sometimes wish to enclose the underside of the porch with screening or a combination of walls and screening. The following are just a few examples of problems that may arise if the area under the porch is enclosed. First, if walls are securely placed under the perimeter of the porch and on top of a patio slab below, there is a risk frost will move the slab enough to place pressure on the porch above potentially causing damage. Second, if the construction is supported from the porch above, additional and unanticipated weight placed on the porch foundation may cause settlement. There may also be concerns with egress windows and mechanical venting into the space. Again, if you anticipate these types of alterations in the future, plan your project accordingly.

PERMITS AND PLANS

A building permit is required to construct a porch. Two sets of detailed plans must be included with permit application. Plans must include a site plan/survey, cross sections, floor plans, and elevations: as well as a complete material. For more information on plans, see the handout on “Building Plans”. Additionally, all construction shall be completed per the approved plans – any changes to the approved plan must be approved before the change is made. All permits, inspection records, approved plans and truss specifications must remain on site for the duration of the construction project.

SMOKE DETECTORS

Alarms must be located in each bedroom and on each floor of the dwelling including the basement. Alarms must be installed in accordance with the manufacturers written instructions. Where framing is exposed, alarms must be hard wired with a battery backup and must be interconnected with other hardwired alarms. When framing is not exposed or it is not feasible to hardwire a smoke alarm, battery powered detectors may be used. Interconnection can also be achieved with a wireless system.

CARBON MONOXIDE ALARMS

Every single family dwelling and every multi-family dwelling unit shall be provided with a minimum of one (1) approved and fully operational carbon monoxide alarm installed outside of and within ten (10) feet of each room lawfully used for sleeping purposes. If bedrooms are located on separate floors, additional carbon monoxide alarms will be necessary within ten (10) feet of these areas. All carbon monoxide alarms shall be installed according to the manufacturer's installation instructions. CO alarms must either be hardwired into the electrical wiring, directly plugged into an electrical outlet without a switch or battery powered.

FIRE SPRINKLERS

If your house is equipped with fire sprinklers, alterations will require a design and separate fire permit.

ENERGY CODE

The energy code does not currently apply to screen porches. Four season porches will need to meet all or a portion of the Energy Code requirements depending on how the porch is designed and built. There are a number of variables related to the energy code, below is a list of minimum Insulation values required:

Reminder – Better insulation means a lower number for U-factor and higher number for R values.

- 1) Windows U-factor .32
- 2) Heat supply and return ducts R-8 with vapor barrier shall be held high enough to allow a minimum R-19 below the duct. Duct seams must be sealed w/ mastic or UL 181 tape.
- 3) Underfloor insulation R-30 shall be directly under floor
- 4) Ceiling insulation R-49 (proper venting required)
- 5) Vaulted Ceiling R-30 (proper venting required)
- 6) Wall insulation R-20

FOUNDATIONS

Porch designs must result in a framing system to transfer all loads to the ground. This includes roof dead loads, snow loads, wall loads, floor dead loads, and floor live loads. Your plans should include detailed information on the sizing of all framing members. If you need assistance determining the size of beams, columns, and footings, you may wish to consult with a structural engineer.

FRAMING

Because the weight of a porch is significantly greater than a deck, all framing members and connections will need to be larger and stronger. Columns and beams need to support roof as well as floor loads. The ledger board will almost always be insufficient to carry roof and wall loads in addition to floor loads. This means that the exterior wall of the home will need to be opened to allow beams to extend into the wall for support. Roof framing cannot be attached to fascia boards but must extend onto the top plate of the exterior wall. Because vaulted or cathedral ceilings are often desired in porches, roof framing systems must be designed with a beam at the ridge since no wall ties or ceiling joists will be available to prevent walls from bowing. See the handout on Basic Wood Framing for additional information.

SAFETY GLAZING

Porches often have many large windows. Windows adjacent to doors, including sliding patio doors and windows exceeding certain size limitations must have tempered or laminated glass. The Building Department has a handout on safety glazing to help identify locations where protection is required. If you have any questions regarding safety glazing, see the Safety glazing handout or contact the Building Department.

GUARDS/GUARDRAILS

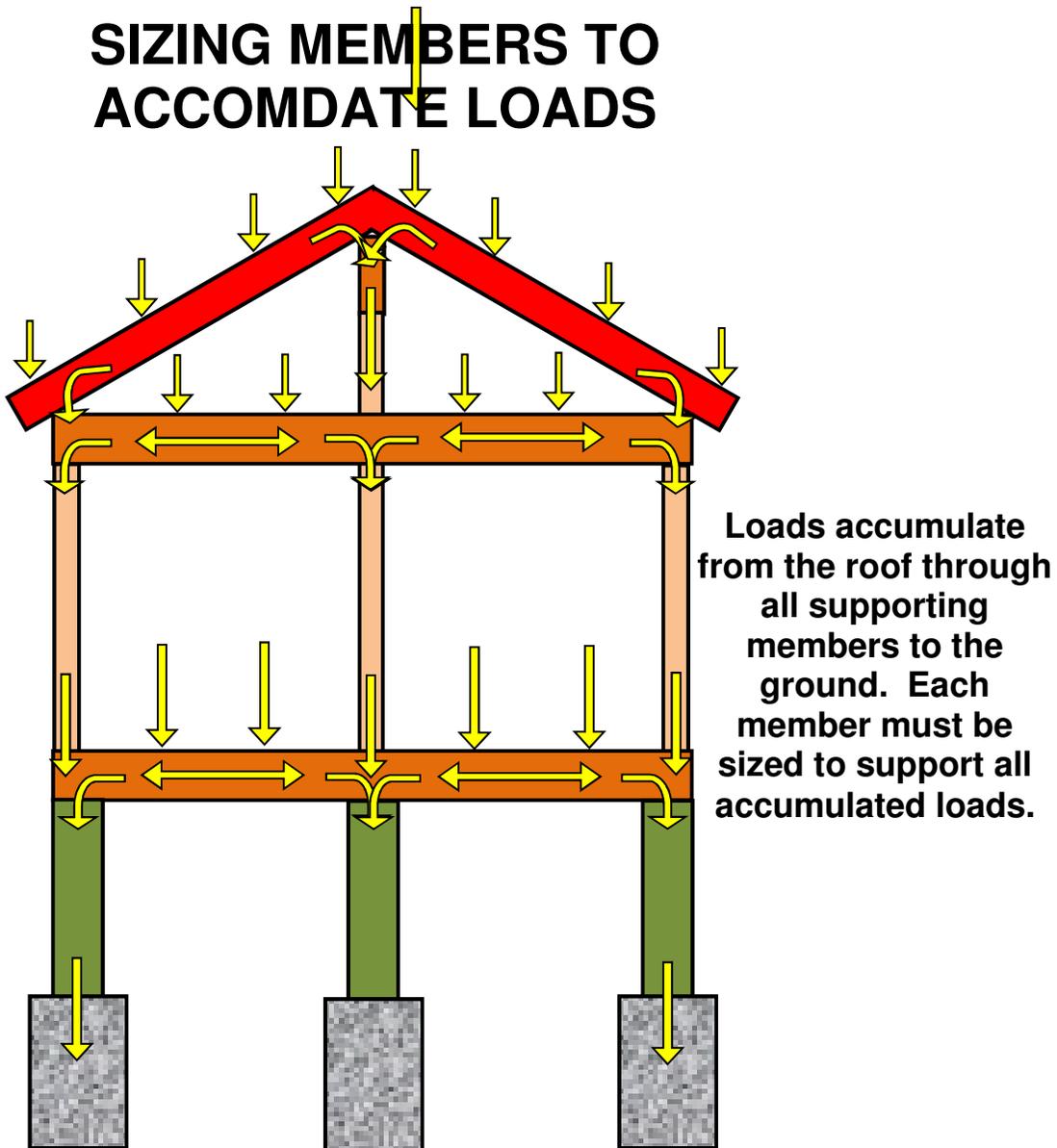
Screen porch floors that are more than 30 inches above grade must have guard rails not less than 36 inches in height meeting guard requirements. Insect screening **is not** an acceptable substitute. The Building Department has a handout on Guards. To avoid installation of a guard, you may wish to start the screening 36 inches off the floor and have a solid wall below the screening. Or, you may construct the wall with balusters as a guard in accordance with the building code.

SIZING INDIVIDUAL PORCH FOOTINGS

The total area of the roof (including overhangs) and floor supported by a member must be used in sizing that member. Footing diameter is based on all accumulated loads. Following are several methods of constructing pier footings followed by a load path diagram. The following design loads are used:

- Roof loads – 60 psf
- Floor loads – 50 psf
- Wall loads – 64-88 plf (wall loads can vary depending on construction of the wall)

SIZING MEMBERS TO ACCOMDATE LOADS



MINIMUM PORCH CIRCULAR FOOTING DESIGN – BOTTOM DIAMETER

Minimum deck footings should be sized according to the following table. Footings must extend **at least 42 inches below grade** (frost line). Footing sizes are based on 1,000 PSF soil to account for the potential soil conditions in the City of Blaine.

Footing Diameter* (inches)	Area	Load Supported	Footing Thickness**
12"	0.79 sq. ft.	785 lbs	8"
14"	1.07 sq. ft.	1,069 lbs	8"
16"	1.40 sq. ft.	1,396 lbs	8"
18"	1.77 sq. ft.	1,767 lbs	8"
20"	2.18 sq. ft.	2,182 lbs	8"
22"	2.64 sq. ft.	2,640 lbs	10"
24"	3.14 sq. ft.	3,142 lbs	10"
25"	3.41 sq. ft.	3,409 lbs	10"
26"	3.69 sq. ft.	3,687 lbs	10"
27"	3.98 sq. ft.	3,976 lbs	10"
28"	4.28 sq. ft.	4,276 lbs	12"
29"	4.59 sq. ft.	4,587 lbs	12"
30"	4.91 sq. ft.	4,909 lbs	12"
31"	5.24 sq. ft.	5,241 lbs	12"
32"	5.59 sq. ft.	5,585 lbs	12"
33"	5.94 sq. ft.	5,940 lbs	12"
34"	6.31 sq. ft.	6,305 lbs	12"
35"	6.68 sq. ft.	6,681 lbs	12"
36"	7.07 sq. ft.	7,069 lbs	14"

****footing sizes refer to the bottom diameter of a typical bell shaped footing***

*****footing thickness refers to the depth of the concrete at the bottom of a typical bell footing***

NOTE: This table should only be used as a guide. It is assumed that at a minimum, Plain Structural Concrete (2,500 PSI) will be used for footings sized herein. Soil types and bearing capacities must be verified at each site. Consult with the Building Department prior to using this table.

2015 MN Residential Code Section R403.1 – Footings shall be supported on undisturbed natural soil or engineered fill.

- Most homes in Blaine are constructed on corrected soil pads. This is because soil conditions prior to development were too low and often unsuitable. These corrected building pads are not much larger than the home structure itself.
- Soils outside of these corrected pads may not be suitable for the construction of decks, porches, or home/garage additions. Any proposed construction of a deck, porch, or an addition may require soils corrections, or an engineer's soils report may be required to verify minimum bearing capacity of 1,500 PSF.

HOW TO DESIGN FOOTING FOR A PORCH

Note: Areas of known poor soils require soils corrections and/or porch footings must be designed by a licensed professional engineer prior to the issuance of the permit. Please call the Building Department for soil information in your development @ 763-785-6170 as your first step in planning for your deck or porch.

1. **Concrete Footings** – The permit holder is responsible for the design size, but they cannot be a smaller diameter than listed in the Minimum Porch Circular Footing Design Table above. In lieu of using this table, another option is to provide an engineer's soils report to verify minimum bearing capacity, and design them accordingly.

Footings must still be set on sandy/suitable soils (no black organic type soils) or the footing inspection will fail. In some developments, the depth to suitable soil may be much deeper than the 42" frost depth. The footing inspection will fail if suitable soils cannot be verified, and soils corrections and/or deck footings must be designed by a licensed professional engineer.

2. **Non-concrete manufactured pin style footings** – Pin style footings may not be permitted for porch footings – verify with the product manufacturer.
3. **Helical piles (screw-pile)** are permitted in accordance with manufacturer's instructions. These are long screw-like piles that can reach suitable soils without the need for soils corrections. Screw-piles must be installed by a certified contractor.

2015 MN Residential Code Section R403.1 – Footings shall be supported on undisturbed natural soil or engineered fill.

OTHER HANDOUTS

The Building Department has a number of other handouts on fasteners, wood framing, stairs, additions, and a host of other topics not covered in this handout.