

## 2021 INTERNATIONAL BUILDING CODE

BASED ON THE 2021 INTERNATIONAL BUILDING CODE

QUICK-CARDS<sup>®</sup> A UNIQUE QUICK-REFERENCE GUIDE

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## FOUNDATIONS & FOOTINGS FOOTINGS SHALLOW FOUNDATIONS **TERM ALERT!** (Based on IBC 1809.2; 1809.4; 1809.6) Footing: a foundational support used to distribute the **Finish Grade** Shallow foundations must be built on undisturbed weight of the structure over a greater area & prevent Frost Line soil, compacted fill material or controlled settling; usually made of concrete. low-strength material (CLSM). Shallow foundation: an individual or strip footing, a mat Depth of footings: 12" Min. below undisturbed 12" foundation, a slab-on-grade foundation or a similar Min 6" Min. ground surface. foundation element. Depth Thick Width of footings: 12" Min. Deep foundation: a foundation element that does not Location of footings on granular soil must be satisfy the definition of a shallow foundation. located so that the line drawn between the lower 12" Min. Width edges of adjoining footings does not have a slope SITE GRADING (Based on IBC 1804.4) Undisturbed soil, compacted fill material or controlled low-strength material (CLSM) steeper than 30° with the horizontal, unless the The ground immediately adjacent to the foundation must material supporting the higher footing is braced be sloped away from the building at a min. slope of 1 unit or retained or otherwise laterally supported or vertical in 20 units horizontal (5% slope) for a minimum STEPPED FOOTINGS (Based on IBC 1809.3) a greater slope has been properly established. distance of 10 ft. measured perpendicular to the wall space. The top surface of footings must be level. Shallow foundations must not bear on frozen soil If physical obstructions or lot lines prohibit 10 ft. of horizontal unless frozen condition is of a permanent character. The bottom surface of footings are permitted distance, a 5% slope must be provided to an alternative to have a slope not exceeding 1 unit vertical in 10 units horizontal (1:10) (10% slope). approved method of diverting water away from the foundation. DEEP FOUNDATIONS Swales used for this purpose must be sloped 2% Min. where (Based on IBC 1810.1.1 - 1810.1.2) Footings must be stepped: located within 10 ft. of the building foundation. Deep foundations must be designed & installed Where it is necessary to change the Impervious surfaces within 10 ft. of the building foundation on the basis of a geotechnical investigation. elevation of the top surface of the footing. be sloped 2% Min. away from the building. Where the surface of the ground slopes Deep foundation elements left in place where a is more than 1 unit vertical in 10 units structure has been demolished must not be used FOUNDATION WALL THICKNESS horizontal (1:10 slope) (10% slope) for the support of new construction. (Based on IBC 18071.61) The thickness of foundation walls must be at least the **DEEP FOUNDATION ELEMENTS PLAIN CONCRETE FOOTINGS** thickness of the wall supported. AS COLUMNS (Based on IBC 1810.1.3 - 1810.2.2) (Based on IBC 1809.8) Deep foundation elements standing unbraced in Edge thickness of plain concrete footings supporting **BUILDING CLEARANCE FROM** air, water or fluid soils are classified as columns ASCENDING SLOPES (Based on IBC 1808.71) walls of other than light frame construction: & be designed from their top down to the point 8" Min. where placed on soil or rock. Where the existing slope is steeper than 1 unit vertical in 1 unit where adequate lateral support is provided. horizontal (100% slope), the toe of the slope must be assumed Deep foundation elements must be braced to provide **MASONRY-UNIT FOOTINGS** to be at the intersection of a horizontal plane drawn from the lateral stability in all directions. top of the foundation and a plane drawn tangent to the slope at (Based on IBC 1809.9) Three or more elements connected by a rigid cap an angle of 45° (0.79 rad) to the horizontal. Masonry-unit footings must be laid in Type M are considered braced, provided the elements are or Type S masonry mortar. Where a retaining wall is constructed at the toe of the slope, Masonry-unit footing depth: at least two times located in radial directions from the centroid of the height of the slope must be measured from the top of the the group not less than 60° (1 rad) apart. the projection beyond the wall, pier or column. wall to the top of the slope. A two-element group in a rigid cap is considered Masonry-unit footing width: 8" Min. wider than braced along the axis connecting the 2 elements. the wall supported thereon. STRUCTURAL CONCRETE (Based on IBC 1904.1; 1905.1) Elements supporting walls must be placed alternately Offset of each course in brick foundation walls Structural concrete must comply with ACI 318. in lines spaced not less than 1 ft. apart & located stepped up from the footings: The ACI 318 text must be modified as indicated in Sections 1 1/2" Max. where laid in single courses symmetrically under the center of gravity of the 1905.1.1 through 905.1.8 of the IBC. wall load carried. · 3" Max. where laid in double courses. FOOTINGS SUPPORTING WALLS OF LIGHT FRAME CONSTRUCTION TYPES OF PORTLAND CEMENT (Based on IBC 1904.1; ACI 318-19) FOOTING SEISMIC TIES (Based on IBC 1809.13) Type Characteristics (Based on IBC Table 1809.7 Where a structure is assigned to SDC D, E or F, Number of Floors Footing Footing individual spread footings founded on soil Site Standard, general purpose cement suitable for all uses. Supported by Footing Commonly used in pavement, sidewalk construction, bridges, Width Thickness Class E or F must be interconnected by ties. Туре (inches) (inches) concrete buildings, railway structures, tanks, reservoirs, Ties must be capable of carrying a force (tension or compression) equal to the lesser of the product culverts, water pipe, masonry units & for all uses of 12 6 cement or concrete not subject to such special conditions. of the larger footing design gravity load times the 2 15 6 seismic coefficient, SDS, divided by 10% & 25% A moderate sulfate resistance cement, used where added of the smaller footing design gravity load. 3 18 8 precaution against moderate sulfate attack is important. Туре Example: drainage structures where ground water sulfate PRESUMPTIVE LOAD-BEARING VALUES (Based on IBC Table 1806.2) is higher than normal but not unusually severe. Vertical Lateral Bearing Lateral Sliding Resistance A high-early-strength cement, used where high strengths Foundation Pressure **Class of Materials Coefficient**<sup>a</sup> Pressure (psf/ft below Cohesion are desired at early periods, usually a week or less. Туре of friction (psf) natural grade) (psf) Used when forms have to be moved as soon as possible. when concrete must be put into service quickly or where **Crystalline bedrock** 12.000 1200 0.70 \_ exposure to the environment needs to be reduced. 4,000 400 0.35 Sedimentaty and foliated rock A low-heat, special cement, used only in mass concrete Туре Sandy gravel and gravel (GW and GP) 3,000 200 0.35 \_ construction (ex. large dams) where temperature rise from IV heat generated during hardening is a critical factor. Sand, silty sand, clayey sand, silty gravel & 2,000 150 0.25 clayey gravel (SW, SP, SM, SC, GM & GC) A sulfate-resistant cement used only in concrete exposed Clay, sandy clay, silty clay, clayey silt, silt & to severe sulfate action. Туре 130 1,500 100 sandy silt (CL, ML, MH and CH) Severe sulfate action includes exposure to sulfate soils & solutions. <sup>a</sup>Coefficient to be multiplied by the dead load. <sup>b</sup>Cohesion value to be multiplied by the contact area, as limited by Section 1806.3.2.

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