1938

Minimum Construction Requirements for New Dwellings Located in the State of Arizona

Federal Housing Administration

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MINIMUM CONSTRUCTION
REQUIREMENTS
FOR
NEW DWELLINGS
LOCATED IN THE
STATE OF ARIZONA

EFFECTIVE SEPTEMBER 15, 1938

FEDERAL HOUSING ADMINISTRATION
PHOENIX, ARIZONA
MINIMUM CONSTRUCTION REQUIREMENTS
FOR
NEW DWELLINGS
LOCATED IN THE STATE OF ARIZONA
THE PHOENIX UNDERWRITING OFFICE

INTRODUCTION

1. The requirements contained herein provide a Minimum Standard of Construction and shall apply to all new construction on which the mortgage is insured by the Federal Housing Administration. They are considered necessary to produce a well-constructed dwelling which will serve as sound security for a long-term mortgage loan. Since these requirements are essentially minimum, they are not to be built down to but form a basis from which to build up. This Administration will recognize and give credit to all construction that exceeds these Minimum Construction Requirements.

2. The Federal Housing Administration has used the recommendations of the National Bureau of Standards, U. S. Department of Commerce; the Forest Products Laboratory, U. S. Department of Agriculture; and the Public Health Service, U. S. Treasury Department, as a basis for these requirements.

3. No attempt has been made to make these Minimum Construction Requirements comply with local building code regulations because of the variation, generally, in building code requirements. However, strict compliance with the local building code requirements and sanitary regulations will be required in all cases where such requirements and regulations provide for a higher standard than these minimum requirements. The highest requirement, whether in the building code, these Minimum Construction Requirements, or the plans and specifications, shall govern.

   NOTE.—These requirements do not eliminate the necessity of providing complete specifications in connection with new construction.

4. When special or unforeseen conditions such as water conditions in excavation arise during construction, which require additional precautions, the Phoenix Underwriting Office may require extra work necessary to correct these conditions before the mortgage is endorsed for insurance.

   SPECIAL NOTE.—If such conditions arise and the Construction Contract makes no provision for the performance by the Contractor of the required necessary work, the Mortgagor shall require the Contractor to perform such necessary work, adjusting the contract price if necessary.

5. The requirements contained herein apply only to conventional types of construction. Plans and specifications calling for methods of
construction at variance with, but equal to these Minimum Construction Requirements must be approved by the Phoenix Underwriting Office, and it is preferred that they be prepared by a competent architect licensed to practice in the State of Arizona.

6. The substitution of materials equal to or better than those called for in these requirements or in the specifications will be permitted when the intent and objectives of these requirements are attained by such substitution.

7. Dwellings of special types, such as prefabricated houses, will be treated as special cases and each individual property will be considered on its own merits.

EXCAVATION

1. Excavation for all foundations shall extend to solid ground. If, upon excavation, other than solid ground is encountered, the footings shall be redesigned and details of same shall be submitted to the Phoenix Underwriting Office for approval.

2. Depth of excavation for trench walls and piers shall be as provided by local building code regulations. In the absence of a specific regulation, they shall be carried below the frost line prevailing in the neighborhood, but in no case less than 18 inches.

3. All debris, such as stumps, roots, vegetation, and wood scraps occurring within the building area shall be removed. The ground level in unexcavated portions shall be at least 18 inches from the bottom of floor joists and untreated girders. [See “Termite Prevention” Paragraph 1(b)].

4. Rough and finished grading shall be brought to levels shown on the drawings. Finish grade shall slope to drain the water away from the building. All backfilling adjacent to the building shall be placed in layers approximately 12 inches in thickness. Each layer shall be puddled and tamped before additional layers are placed.

MASONRY

A. General.

1. Poured concrete mixture shall be as follows:
   (a) For plain concrete—1 part portland cement, 3 parts sand, 4 parts gravel or crushed stone; or 1 part portland cement, 7 parts pit run aggregate.
   (b) For reinforced concrete—1 part portland cement, 2 parts sand, 4 parts gravel or crushed stone.
   (c) Water content shall be not more than 7 gallons of water per bag of cement.
   (d) All materials shall be clean and free from loam and other foreign matter.

   NOTE.—Boulders used as part of the aggregate will not be permitted.

2. When concrete is not poured in one operation, the top surface of the previous pour shall be cleaned, scored and wetted before continuing the pour. Vertical joints shall be keyed.

3. In extremely hot and dry weather, the concrete shall be kept wet for at least 3 days.

4. In freezing weather the concrete mix at the time of pouring shall have a temperature of at least 40 degrees Fahrenheit, but not more than 120 degrees Fahrenheit, and shall be maintained at a tem-
perature above freezing until concrete has thoroughly set. Integral compounds shall not be used in lieu of maintaining the above required temperature.

5. **Floor finish.**—Topping, except for integral finish, shall be 1 part portland cement and 3 parts sand.

6. **Mortar mixture shall be as follows:**
   
   (a) For all masonry below grade—1 part portland cement, 2 parts sand by volume. Lime equal to not more than 10 percent of the cement by volume may be added.

   (b) For all other masonry work—1 part portland cement, 1 part lime putty, 6 parts sand by volume; or a prepared mortar mixed and used according to manufacturer's directions.

7. Retempering of mortar will not be permitted.

8. **Joints** between masonry units shall be not over \(\frac{3}{4}\) inch thick. In walls built of solid masonry units, all joints shall be filled solid. When hollow units are used, the units shall be laid with no through mortar joints. All joints shall be pointed solid with mortar on both sides of the wall. All outside and exposed inside joints shall be weathered or tooled unless approved otherwise by the Phoenix Underwriting Office.

9. **Materials** for masonry walls shall be hard-burned brick, stone, poured concrete, thoroughly cured concrete units, or hard-burned load-bearing structural clay tile. The use of other masonry materials, including masonry veneer materials less than 4 inches thick, less hard-burned brick, second-hand brick, and less hard-burned load-bearing structural clay tile shall be approved by the Phoenix Underwriting Office.

10. **Forms.**—All forms for concrete shall be tight, straight, and plumb and shall be rigidly braced to properly support the concrete until set. Forms shall not be removed until concrete has thoroughly set. Loads shall not be placed on concrete until sufficient strength has developed to support such loads.

11. **Reinforcing.**—The reinforcing for concrete shall be mild steel, new billet or rerolled deformed bars which meet the recommendations of the American Society for Testing Materials, placed in correct position and wired so that displacement will not occur when concrete is poured. Reinforcing shall be bent around all corners and lapped not less than 30 diameters. Laps shall be securely wired.

### B. Footings.

1. All footings shall bear on undisturbed soil and be designed to distribute sufficiently the superimposed load to the particular type of soil upon which they bear.

2. Where soil conditions prevent sharp-cut trenches for footings, side forms shall be used.

3. In all cases, footings of poured concrete will be required.

4. **Minimum dimensions of footings shall be as follows:**
   
   (a) Under foundation walls and trench walls of all frame dwellings and 1-story masonry dwellings: thickness 8 inches; projection 4 inches on each side of wall.

   **Note.**—The requirements for frame dwellings shall also apply to masonry veneered frame dwellings.
(b) Under foundation walls of masonry dwellings more than 1 story in height: thickness 12 inches; projection 6 inches on each side of wall. Footings may be same as in (a) if reinforced with not less than two 5/8-inch bars continuous in footing and spaced not to exceed 8 inches o. c.

(c) Under piers supporting exterior walls and bearing partitions: thickness 12 inches; projection each side 6 inches; area 4 square feet.

(d) Under posts and columns: thickness 12 inches; size 2 by 2 feet.

(e) Under chimneys: thickness 12 inches; projection on all sides 6 inches.

NOTE.—All footings shall be adequately reinforced where they cross and bear on filled trenches or other similar disturbed soil conditions.

5. Modifications of the above requirements may be made if such modifications are fully detailed and noted on drawings and are approved by the Phoenix Underwriting Office.

C. Foundations.

1. Top and bottom of foundations shall be level.

2. On sloping sites, foundation walls may be stepped provided each step on the top of the wall overlaps the step on the bottom of the wall not less than the full depth of the wall.

3. In no case shall the foundation wall thickness be less than that of the wall supported.

4. The following minimum requirements for foundation wall thickness shall apply:

   (a) 6-inch thickness: for poured concrete, supporting 1-story wood frame structures without basement.

   (b) 8-inch thickness: for all other poured concrete walls.

   (c) 8-inch thickness: for masonry unit walls which extend not more than 7 feet below outside finished grade. Maximum total height of the foundation wall and wall supported, 35 feet.

   (d) 12-inch thickness: for masonry unit walls which extend more than 7 feet below outside finish grade.

SPECIAL NOTE.—The Phoenix Underwriting Office may, at its discretion, because of special or unforeseen soil conditions, require that the allowable depth of the foundation wall below outside finished grade be reduced; that the wall be adequately reinforced; or that the thickness be increased to resist lateral forces. The National Bureau of Standards, U. S. Department of Commerce, in its publication entitled “Recommended Minimum Requirements for Small Dwelling Construction,” recommends a maximum depth of 5 feet below outside finished grade for 8-inch-thick foundation walls constructed of masonry units. It is recognized that in many cases, because of the nature of the soil, it is safe to extend the foundation walls to the depths permitted in these Minimum Construction Requirements. It must not be construed, however, that the permissible depths contained in these Minimum Construction Requirements will be applicable in all cases.

5. If in the opinion of the Phoenix Underwriting Office, soil conditions make it necessary, because of the presence of alkaline salts which may be destructive to the foundation wall, the foundation wall shall be plastered on the exterior with at least 1/2 inch of portland cement plaster over which shall be applied a heavy coat of undiluted...
hot tar or asphalt. This treatment shall extend from the adjoining outside finished grade to the outside edge of the footing.

Note.—When masonry units are used for foundation walls, particular attention shall be paid to Paragraphs 6 and 9 under Masonry-A. General.

6. When foundation walls are built of hollow masonry units, the top course shall be of solid masonry units or solid masonry material and shall be not less than 4 inches in height.

7. Foundation walls and basement bearing partitions, when constructed of structural clay tile, shall have all corners and intersections of partitions with foundation walls constructed of vertical cell corner blocks, or of solid brick.

8. Pilasters not less than 4 by 12 inches shall be constructed to form piers under the ends of all girders framing into 8-inch-thick foundation walls built of masonry units and poured concrete walls less than 8 inches in thickness and shall be bonded into the wall. Pier construction shall be as follows:

(a) When the foundation walls are of hollow concrete block construction, the top 8 inches of the pier shall be of solid masonry material.

(b) When the foundation walls are of load-bearing structural clay tile, the pier shall be constructed of brick extending from footing to girder.

9. Foundation walls supporting masonry veneered stud frame walls shall be of sufficient thickness that neither the veneer nor the stud frame projects beyond the outer or inner faces of the foundation wall.

10. Foundation walls supporting frame construction shall extend not less than 8 inches above the adjoining outside finish grade.

11. Interior piers shall be of concrete, minimum size 14 inches square at bottom and 8 inches square at top, and shall extend to the under side of girders.

12. All masonry chimneys shall have foundations of masonry or concrete which shall extend down to the level of the foundation wall footing surrounding the area where the chimney is located, and where chimneys occur in outside walls or inside bearing walls, the footing shall be bonded with the wall footing.

13. A continuous reinforced concrete slab resting directly upon the ground, with curtain walls of adequate width and thickness extending sufficiently into the ground to protect against dampness and erosion, may be used for the foundations of light frame structures when located on firm, reasonably level, and well-drained soil. The preparation of the slab bed and the construction of the slab shall be in accordance with requirements established by the Phoenix Underwriting Office.

14. An opening of not less than 18 by 24 inches shall be installed to provide access for inspection and repair in each unexcavated space under wood and metal floor construction, and under concrete slabs where piping, duct work, etc. requiring periodic inspection or repair are located.

15. Openings shall be installed in the foundation or exterior walls below the first floor to provide cross-ventilation in all unexcavated spaces in every building in which the floor is of timber or metal con-
The ventilating area of the opening shall equal 2 square feet for each 25 lineal feet of exterior wall or major fraction thereof, with one opening of at least 1 square foot area within 5 feet of each corner of the exterior walls. Bottom of openings shall be at least 3 inches above adjoining grade. Openings shall be covered with copper or galvanized iron screen of not more than 1/4-inch mesh. Openings will not be required to be placed in the front wall if adequate cross-ventilation is provided otherwise.

16. Area walls and foundation walls for porches, steps, and terraces shall be adequately bonded or anchored to main walls.

D. Exterior Masonry Walls.

Note.—“Salmon” or soft brick will not be accepted for use as facing on outside surfaces of exterior walls.

1. Masonry walls shall have a thickness of not less than 8 inches for a height not to exceed 35 feet. When two or more units are used to make up the thickness of the wall, the inner and outer courses shall be bonded by at least one header course in every six courses, or by one full-length header in every 72 square inches of wall surface.

2. Masonry veneer applied to masonry walls shall be tied to the wall by full-length headers or noncorrodible metal wall ties spaced every fifth course or 15 inches vertically and not more than 32 inches o. c. horizontally.

Note.—Veneer shall not be considered a part of the required wall thickness unless bonded as required in Paragraph 1 above.

3. Proper provision shall be made for adequate bonding and anchoring together of all intersecting concrete and masonry walls.

4. The ends of girders framing into walls constructed of hollow masonry units shall bear upon solid masonry construction at least 8 inches in depth or upon other suitable bearing securely anchored to masonry walls. In such walls, all floor joists shall bear upon solid masonry not less than 4 inches in depth, and lintels over openings shall be supported upon solid masonry material equivalent in depth to at least two courses of brick.

5. Masonry veneer applied to wood frame walls shall have a thickness of not less than 3 1/2 inches and a height of not more than 35 feet; and veneer shall be anchored to the wood frame with noncorrodible metal ties spaced every fifth course or 15 inches vertically and not more than 32 inches o. c. horizontally. Provide a 1-inch space between the veneer and the wood construction. In all cases the veneer shall be backed up with waterproof building paper or saturated asphalt felt which shall extend down and under the bottom course of veneer.

6. Party walls shall be not less than 8-inch-thick masonry construction; when flat roofs occur, the wall shall extend from footing to 8 inches above the roof and be capped with stone, corrosion-resisting sheet metal, portland cement, or terra cotta coping; when pitched roofs occur, the wall shall extend from footing to underside of roof boards at all points to form fire stops.

7. Steel or reinforced concrete lintels or properly designed masonry arches will be required in the heads of all openings in masonry and masonry veneered walls.
E. Chimneys.

1. All masonry chimneys, except those with solid brick walls 8 inches or more thick, shall be lined throughout with fireclay flue lining. Minimum flue sizes: for heating plants, 8½ by 8½ inches; for fireplaces, 8½ by 13 inches; or circular flues of equivalent effective area.

Note.—The interior of chimneys shall be smooth when flue lining is not installed.

2. All heating equipment shall connect into individual flues except as provided in Paragraph 4.

3. All chimneys shall be capped to form a wash from the flue to the outside edge of the chimney.

4. All gas-fired house heaters and built-in unit heaters shall be connected to flues constructed of masonry as described in Paragraph 1, or constructed of not less than 20-gauge corrosion-resisting sheet metal properly insulated with asbestos or other acceptable fireproofing material, which shall comply with the recommendations of the Underwriters' Laboratories, Inc. Such flues shall extend through the roof. Gas-burning hot-water heaters shall have vents which may connect into the house heating flue, provided the connection is below the breeching.

5. In masonry chimneys, containing three or more flues, each group of two flues shall be separated from the other single or groups of two flues by brick withes not less than 3½ inches wide. Where two flues are grouped without withes, the joints in the respective flue linings shall be staggered.

6. All fireplaces except false fireplaces shall have hearths supported on fireproof construction. The hearths shall project at least 16 inches measured from the chimney breast, and the width shall be not less than the width of the fireplace opening plus 16 inches.

7. Open fireplaces shall be constructed with smoke chambers and dampers and shall be lined with fire brick or other materials approved by the Phoenix Underwriting Office. The effective area of the flue shall be not less than 1/4 of the area of the fireplace opening. When an ash dump is provided, ashes shall empty into an enclosed chamber of fireproof material provided with a metal cleanout door.

8. All masonry or concrete chimneys and all fireplaces shall be adequately reinforced and anchored to the structure.

9. All chimneys shall extend not less than 2 feet above the highest ridge.

F. Cement Floors, Driveways, and Walks.

1. The garage, terrace, porch, and interior floors, walks, and driveways, if of concrete construction, shall have a minimum thickness of 4 inches and shall be properly surfaced. The slabs shall be laid on a bed (4-inch minimum thickness) of gravel, cinders, or other approved material. The tops of all interior concrete floors in dwellings shall be at least 8 inches above the outside finished grade.

2. Garage floors shall be laid separately from the garage foundation walls and footings, and an approved expansion joint shall be provided between the driveway slab and the concrete apron at the

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garage door. Driveways over 15 feet in length shall have expansion joints not more than 15 feet o. c.

3. All outside brick steps shall be of hard-burned brick or approved paving brick. "Salmon" or soft brick will not be accepted for treads, platforms, terraces, or for exterior use.

4. Basement or cellar floor slabs shall be not less than 3-inch concrete if finished monolithic, otherwise 3-inch concrete and 1-inch topping.

5. All openings in basement floors shall have covers which shall be flush with the finish floor. Where floor drains occur, floor shall slope slightly to drain.

6. When the heating plant is located above the basement, the floor area where the heating plant is located shall be finished with concrete 3 inches thick, or with other noncombustible material. Chamfer tops of floor joists when concrete is let down below the top of the wood construction.

7. Tile floors supported on wood construction shall have concrete underfloor not less than 2 inches thick. Boarding supporting the underfloor may be let down between the joists but not to exceed 1 inch. Chamfer tops of joists.

8. All downspouts or leaders emptying on grade shall have splash blocks constructed of concrete or other approved material so located as to carry the rain water at least 2 feet 6 inches from the building.

DAMPROOFING

1. One layer of felt weighing 30 pounds per square shall be embedded in hot asphalt on top of all foundation walls supporting masonry.

2. Cellar, basement, and furnace pit shall be constructed to be dry, and when they occur in localities where dampness exists or water penetration impends, shall have walls and floors waterproofed.

3. In cases where subsurface water exists under pressure, walls below grade, and floors shall be adequately designed, reinforced, and constructed to be watertight.

4. A dry basement shall be provided and where dampness or water conditions exist, walls and floors shall be made watertight before final acceptance.

ADOBE CONSTRUCTION

1. Adobe walls shall have a footing of concrete not less in width than 175 percent of the wall thickness and not less in thickness than twice the projection of the footing beyond the wall, provided if footing is more than 2 feet below the natural grade and the bearing capacity of the soil is found by test to be sufficient, the footing may be reduced accordingly.

2. All exterior adobe walls shall have a foundation of concrete extending not less than 1 foot above finished grade, and adobe shall be laid upon a layer of saturated roofing felt not less than 30 pounds per square.

3. Nonbearing partitions of adobe shall be not less than 8 inches in thickness, bonded and toothed into the side walls or metal mesh bond of galvanized wire mesh No. 20, one-quarter inch mesh may be used.

4. All openings in adobe walls shall be spanned with iron, steel, or reinforced concrete lintels with a bearing at each end of not less than 8 inches on spans of 4 feet or less and 1½ inch additional bear-
ing for each additional foot of span, the end of each lintel to rest upon a thickness of 30-pound saturated roofing felt.

5. All copings exposed as parapets, etc., shall be either brick rowlock in cement mortar, plain concrete 4 inches thick, or 1½ inches of cement mortar on galvanized metal lath.

6. One-story construction shall have a reinforced concrete belt course at the top of all walls as a bearing for ceiling and roof joists. Belt course to be the full width of the wall and not less than 6 inches in thickness, and shall be reinforced with steel reinforcing rods whose cross sectional area shall be at least ¼ of 1 percent of cross sectional area of the belt course and continuous around the wall.

7. Two-story construction shall have two continuous reinforced concrete belt courses, namely: At the top of first story, a belt course the full width of the wall below, not less than 8 inches in thickness and reinforced with steel reinforcing rods whose cross sectional area shall be at least ¼ of 1 percent of cross sectional area of the belt course and continuous around the wall as a bearing for second floor joists. The top of second story wall shall have a belt course of reinforced concrete as required for the top of one-story walls.

8. The exterior walls of one-story construction shall not exceed 12 feet in height from the top of the foundation to the top of the wall, and shall be not less than 12 inches thick.

9. The exterior walls of two-story construction shall not exceed 22 feet in height from the top of the foundation to the top of the wall and shall be not less than 18 inches thick at the first story and not less than 12 inches thick at the second story. Adobe construction shall not exceed two stories or 22 feet in height.

10. All matrix used for adobe brick shall be of grade of adobe which dries very hard, and is free of sand loam or other detrimental materials. Adobe brick shall be reinforced with a sufficient amount of clean wheat straw or dry elastic twigs. No adobe brick shall be laid for at least 3 weeks after making, depending upon weather conditions. Adobe brick shall have a compressive working strength of at least 25 pounds per square inch.

11. Adobe shall not be used for isolated piers or porch columns (wall sections less than 28 inches shall be considered as isolated piers), in which case the concrete lintel shall be designed to span the distance of both openings and the pier.

12. If adobe is used for chimney walls they shall be at least 12 inches thick and lined with flue lining as provided in E. CHIMNEYS—Paragraph 1.

13. All adobe where exposed to the weather shall be plastered with portland cement plaster of a minimum thickness of ½ inch, plaster to be applied over galvanized stucco mesh and secured at 1-foot intervals each way, and drifted in alternate directions.

14. Mortar for adobe walls may be similar in composition to the adobe brick. Time shall be allowed in laying up for equalizing of settlement and drying of mortar. Laying shall be done in uniform stages throughout the structure.

15. Interior partitions of stud construction may be used. Such, if bearing partitions, must be on continuous concrete foundations. All stud partitions in contact with adobe walls must be anchored thereto with not less than 3 perforated galvanized strap anchors with hooked ends embedded in the adobe wall at least 10 inches.
STRUCTURAL STEEL AND IRON

1. When local building code does not cover requirements for structural steel and iron, the design shall comply with the recommendations of the American Institute of Steel Construction.

2. Connections shall be riveted, bolted, or welded, and shall be so designed as to fully develop the strength of the structural members. Bearings of steel beams and girders on masonry walls shall extend at least 4 inches into the wall, and shall be solidly bedded in portland cement mortar. Bearing plates shall be designed to carry the load and shall have a minimum thickness of $\frac{7}{16}$ inch.

3. All steel or cast iron columns shall have flanged bases and caps. Column caps shall be anchored to beams or girders. Loose shims will not be acceptable. Bases of columns shall be securely anchored by anchor bolts, or by embedding in concrete.

LUMBER

1. All softwood framing lumber shall bear the official grade mark and symbol of the Association recognized in the trade as covering the particular species. All grade marking shall be done under the supervision of:

   (a) The manufacturers' association responsible for the grading standards for the species involved; or
   (b) An inspection bureau recognized and authorized by the manufacturers' association responsible for the grading standards, to grade according to such rules.

2. All softwood board lumber shall meet all the grading requirements of the Association recognized in the trade as covering the species and under whose grading rules it was produced.

   NOTE.—The requirements in Paragraphs 1 and 2 above shall not apply to millwork or interior finish. The word "softwood," as used herein, shall be interpreted to include Douglas Fir, White Fir, Cypress, Western Larch, West Coast Hemlock, California Redwood, Cedar, Eastern Hemlock, Tamarack, Sitka Spruce, Engelmann Spruce, Eastern Spruce, Southern Yellow Pine, Ponderosa Pine, Sugar Pine, Idaho White Pine, Northern White Pine.

3. Framing lumber for joists, sills, girders, rafters, purlins, and plates shall be No. 1 Dimension (Common) or better.

4. All other framing lumber, including studs, bridging, bracing, and collar beams shall be No. 2 Dimension (Common) or better.

5. All board lumber for subflooring, sheathing, roof boarding, shingle lath, etc., shall be No. 2 common or better.

   NOTE.—Board lumber, No. 3 Common, of woods comparable to No. 2 Common grade in the other softwoods, will be acceptable, such as: White Fir, Engelmann Spruce, Eastern Spruce, Ponderosa Pine, Sugar Pine, Idaho White Pine, Northern White Pine.

6. All lumber shall be dry and well seasoned, and the moisture content shall not exceed 19 percent.

7. All rough lumber dimensions given under "Wood Framing" below are nominal sizes. Finished dimensions of all lumber shall comply with the American Lumber Standards.
WOOD FRAMING

NOTE.—Splicing of structural wood framing members between bearing points will not be permitted. In all cases, regardless of location, where the structural strength of framing members is definitely impaired by cutting, drilling, or by inherent defects, such members shall be replaced or reinforced as required by the Phoenix Underwriting Office.

A. Floors and Roofs.

1. All wood floor and roof framing shall be kept at least 2 inches away from the chimney masonry, except when 8 inches of masonry is used outside the flue lining, in which case the framing may be built flush with the chimney masonry. The 2-inch space between the chimney masonry and the floor framing shall be filled with fire-resistant material to form a fire stop.

NOTE.—In no case shall wood framing members bear on the masonry of chimneys, except on piers which are built integral with the chimney masonry.

2. Girders may be structural steel, solid wood, built-up wood, or reinforced concrete.

3. All joints of solid and built-up wood girders shall be made over pier or column supports.

4. Wood posts, when used as columns in basements, shall bear on a cement base which shall extend not less than 3 inches above the finish floor. The base shall bear directly on the post footing.

5. The distance between supports under wood girders shall not exceed the following:

   (a) 4 by 4 girder, 1 story: carrying partition, 3 feet; not carrying partition, 5 feet.
   (b) 4 by 6 girder, 1 story: carrying partition, 5 feet; not carrying partition, 7 feet.
   (c) 6 by 8 girder: 1 story, not over 8 feet; 1½ and 2 story, not over 7 feet.
   (d) 6 by 10 girder: 1 story, not over 9 feet; 1½ and 2 story, not over 8 feet.

NOTES.—The above spans are based on a minimum fiber stress of 1,200 pounds. When the allowable fiber stress of the species of wood used is other than 1,200 pounds, spans shall not exceed those determined by established engineering practice.

For all buildings the girders under the first floor joists must be large enough to carry all first and second floor and roof loads, including concentrated loads due to bearing partitions coming on them. Girders or foundation walls shall be placed under all bearing partitions.

6. Where floor joists frame into the side of wood girders, the joists shall be supported on metal joist hangers or on a bearing strip or ledger board on the side of the girders. Size of ledger shall be at least 2 x 3 inches. The notch in the end of the joist shall be not more than ¼ of the joist depth.

7. Ends of floor joists framing into masonry walls shall have not less than 4-inch bearing and shall have at least a 3-inch bevel or fire
cut. The ends of floor joists and girders which frame into the masonry walls below outside finish grade shall receive a good brush coat of creosote.

8. Each fourth joist in wood floor construction framing into masonry walls shall have a metal strap anchor applied on the side and near the bottom of the joist and shall extend into the masonry wall. Masonry walls running parallel to the floor joists shall be tied to the floor construction with metal strap anchors spaced not over 6 feet apart and extending over and secured to at least 3 joists.

9. Floor joists shall be doubled under all partitions which run parallel to the floor joists. Doubled joists shall be separated and blocked at 4-foot intervals where piping or duct work occurs.

10. Headers and trimmers shall be doubled except that headers 4 feet or less in length may be of single thickness provided the header is supported in metal joist hangers or on not less than 2 x 3 inch ledger boards and header is secured by spikes driven through one thickness of the trimmers into the ends of the header. Headers receiving more than 4 tail beams shall have ends supported in metal joist hangers.

11. Ends of lapped joists shall rest on girders or on bearing partitions and shall be securely nailed to plate and to each other.

12. Overhanging cantilevered construction; bay windows, overhanging second floors, and all projections carrying floor and roof loads which are not supported directly by a foundation shall be fully detailed on the drawings submitted with the application.

13. Floor (including attic floor) and flat roof joists shall be solid bridged or cross-bridged with not less than \( \frac{1}{3} \) inch bridging at intervals not to exceed 8 feet and securely nailed at each end. Metal bridging may be used when approved by the Phoenix Underwriting Office.

14. The cutting of floor joists to facilitate the installation of piping and duct work will be permitted with the following limitations:

(a) The top or bottom edges of joists may be notched not to exceed \( \frac{1}{6} \) of the joist depth. Notching the top or bottom edge of joists will not be permitted in the middle third of any joists span.

(b) If cutting of a floor joist more than \( \frac{1}{6} \) of its depth is found necessary, a header the full depth of the joist shall be cut in to support the end of the joist.

(c) Where location of pipes necessitates passing through the joists, holes shall be drilled to receive the pipes. The diameter of the holes shall be not more than \( \frac{1}{2} \) inch greater than the outside diameter of the pipe and in no case greater than 2\( \frac{1}{2} \) inches. The edge of the holes shall not be located nearer than 2 inches from the top or bottom edge of the joist.

15. Maximum spans for all wood floor joists shall be as listed in the following table. The spans are figured for a maximum deflection of \( \frac{1}{360} \) of the span, based on a total live and dead load of 50 pounds
per square foot, uniformly distributed. The species of wood are grouped according to the allowable working stresses recommended by the Forest Products Laboratory, Madison, Wisconsin.

**Maximum spans for floor joists**

Assumed live load, 40 pounds per square foot; dead load, 10 pounds per square foot

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<tr>
<th>Lumber size</th>
<th>Maximum clear span</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Minimum fiber stress, 1,200 pounds</td>
</tr>
<tr>
<td></td>
<td>Douglas Fir (Coast Region and Inland Empire), Southern Yellow Pine, Western Larch</td>
</tr>
<tr>
<td>Nominal</td>
<td>Actual</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<tr>
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</tr>
</tbody>
</table>

**Note:** Where the spacing of floor joists exceeds 16 inches o. c., or where the allowable fiber stress of the species of wood used is in excess of 1,200 pounds, the size and span of the joists shall be determined on the same basis as used for this table.

16. All subfloors shall be 1 inch thick, not over 10 inches wide, laid diagonally with ends cut over the joists. Boards over 8 inches wide shall be triple-nailed. This requirement also applies to subfloors when used on the second floor.

**Note:** End-matched, (T. & G.) boards may be used for subflooring provided no two adjoining boards break joints over the same joist space, and each board shall bear on at least two joists.

17. All subflooring shall be covered with building paper or deadening felt before laying the finish floor.

18. Finish flooring not less than 13/16 inch thick T. & G. may be used without a subfloor, provided the ends of the flooring boards are cut over the joists.

19. Floor coverings of linoleum, composition or rubber tile on wood construction shall be applied over T. & G. wood flooring not less than 5/8 inch in thickness nor more than 4 inches in width, and either sanded or scraped smooth before covering is applied.
20. Maximum spans for ceiling joists shall be as listed in the following table. The spans are figured for a maximum deflection of 1/360 of the span, based on a dead load of 10 pounds per square foot (no live load), uniformly distributed.

**Maximum spans for ceiling joists**

<table>
<thead>
<tr>
<th>Lumber size</th>
<th>Minimum fiber stress, 1,200 pounds</th>
<th>Minimum fiber stress, 1,600 pounds</th>
<th>Minimum fiber stress, less than 1,600 pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spacing center to center</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal</td>
<td>Actual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 by 4 ...</td>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/8 by 3 1/2</td>
<td>20</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>2 by 6 ...</td>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/8 by 5 1/2</td>
<td>20</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>2 by 8 ...</td>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 1/8 by 7 1/2</td>
<td>20</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>21</td>
<td>8</td>
</tr>
</tbody>
</table>

*Note:* Where the attic space above ceiling joists is unfinished but is usable for storage space, or if the space is suitable for finishing into future habitable rooms, the spans for the ceiling joists shall be figured the same as for floor joists.

21. Ceiling joists shall, whenever possible, serve as ties for the rafters and shall be securely nailed to the rafters.

22. An adequate opening for access into each attic space shall be provided to allow for inspection and repair.

23. All attics and spaces between flat roofs and ceilings shall be ventilated by screened louvres or other means approved by the Phoenix Underwriting Office.

24. Collar beams of 1 x 6's or 2 x 4's shall be installed on at least each third pair of roof rafters and shall be securely nailed to the rafters. Maximum spacing of collar beams, 5 feet o. c.

25. Where ceiling joists serve as collar beams and occur above the midpoint of the rafter, adequate provision shall be made for tying the lower end of the rafter to the floor construction. When the installation of this tie is not possible because of structural conditions, the rafter size shall be increased sufficiently to support the roof load without thrust or undue bending in the lower end and the size of the collar beams shall be not less than that of the rafters.

26. In flat roof construction, when the ceiling is suspended from the roof, the spans for the roof joists shall be as required in the floor joist table. The ceiling joists shall be 2 x 4's of same spacing as roof
joists and supported by 1 x 4 inch hangers spaced not more than 6 feet o. c. and securely nailed to sides of the roof and ceiling joists.

27. Maximum spans for wood rafters shall be as listed in the following table, and are based on a total live and dead load of 30 pounds per square foot, uniformly distributed. (The live load is considered as acting normal to the roof surface.)

**Maximum clear spans of rafters**

*For Wood and Asphalt Shingle Roofs*

(Rafters for slate, tile, or asbestos-cement (rigid) shingle roofs shall be of sufficient size to carry the load)

Assumed Total Live and Dead Load—30 lbs. per sq. ft.

(Clear span shall mean the distance measured horizontally from plate to a point directly beneath the ridge. The actual rafter length will depend on the roof slope and must be determined accordingly)

*For Roof with a Minimum Slope of 5 to 12*

<table>
<thead>
<tr>
<th>Lumber size</th>
<th>Maximum clear span</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum fiber stress, 1,200 pounds</td>
</tr>
<tr>
<td>Nominal</td>
<td>Actual</td>
</tr>
<tr>
<td>2 by 4</td>
<td>1 ¼ by 3 ½</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2 by 6</td>
<td>1 ½ by 5 ½</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>2 by 8</td>
<td>1 ¾ by 7 ¼</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes.—Where the allowable fiber stress of the species of wood used is in excess of 1,200 pounds, increased spans will be permitted provided they are determined on the same basis as used for this table. Rafters on roofs with slopes less than 5 to 12 shall be figured same as floor joists.

28. Clear rafter spans which exceed the maximum spans given in the table above shall have 2 by 4 inch braces installed at every third rafter extending down to a bearing partition. A continuous 2 by 4 inch purlin shall be placed at the upper end of the braces. In no case shall the braces bear on ceiling joists between supports unless the ceiling joists are sufficiently strengthened to receive the added load.

29. Rafters shall be securely spiked to the wall plate. Opposing rafters shall be framed directly opposite each other at the ridge. There shall be a ridge board at all ridges and a valley rafter at all valleys. The depth of the ridge board and valley rafter shall be not less than the cut end of the abutting rafters. Valley rafters shall be not less than 2 inches thick for spans under 12 feet and for spans over 12 feet the size shall be increased.
30. All openings in roof construction for dormer windows which are not supported on partitions, shall be framed with doubled rafters and headers.

31. Requirements for headers and trimmers for roof framing around chimneys shall be same as required for floors except that for a sloping roof where headers are less than 4 feet in length and the chimney is either at the ridge or the eaves, the trimmers may be single.

32. Roof rafters shall be covered with 1-inch roof sheathing not more than 8 inches in width, laid closed for tile, slate, asbestos-cement, or asphalt shingles; or 1 x 4 inch shingle lath for wood shingle roof, spaced according to shingle exposure. All roof sheathing and shingle lath shall be securely nailed to rafters at each bearing.

NOTE.—End-matched (T. & G.) boards may be used for roof sheathing provided no two adjoining boards break joints over the same rafter space, and each board shall bear on at least two rafters.

33. Crickets or chimney saddles shall be installed on the upper side of all chimneys that are not in contact with the ridge.

B. Exterior Walls.

1. Wood stud walls shall have corner posts built up using—
   (a) Two 2 x 4 pieces with a 2 x 6 member between; or
   (b) A 4 x 6 solid post with a 2 x 4 piece to form the interior lathing corner; or
   (c) Three 2 x 4 pieces arranged to form the interior lathing corner.

2. Studs shall be not less than 2 x 4's spaced not more than 16 inches o. c.

3. All window and door openings shall have studs doubled on jambs. The inner stud shall be cut to receive the lintel or header over the opening and shall extend in one piece from lintel or header to bearing.

4. Lintels or headers over all openings shall be doubled and shall be set on edge. Spans for lintels or headers shall not exceed the following for the size given:

   | Spans up to 4 feet: two 2 x 4's |
   | Spans 4 feet to 5 1/2 feet: two 2 x 6's |
   | Spans 5 1/2 feet to 7 feet: two 2 x 8's |
   | Spans over 7 feet: two 2 x 10's |

In lieu of lintels, trussed construction may be used.

5. Methods of sill construction must be fully detailed on the drawings submitted with the application.

6. All sills and all bearing plates for roof rafters framing into masonry walls shall be bolted to the masonry walls with 1/2-inch bolts bedded firmly in the masonry and spaced not more than 6 feet apart.

7. All sills and girders on top of foundation walls and piers shall be levelled, shimmed up with slate chips or brick, and thoroughly bedded in cement mortar.

8. Top plates shall be not less than double 2 x 4's which shall lap at all corners and at all intersecting partitions. All such laps shall be securely spiked.

9. Wood sheathing, when laid diagonally on exterior walls, shall be applied at approximately 45 degrees and extend in opposite directions on each side adjoining at the corner, and corner bracing will not be required.
10. In all cases except where diagonal wood sheathing is used, all external corners shall have diagonal 1 x 4 inch braces let into the outside face of the studs at approximately 45 degrees and wherever possible, shall extend from sill to plate. Braces shall be securely nailed to each stud and to sill and plate. When openings occur near the corners, 1 x 4 inch knee braces let into the face of the studs shall be installed above and below the openings at approximately 45 degrees extending across not less than 3 stud spaces.

11. Wood sheathing boards shall be 1 inch thick, not more than 8 inches wide, laid closed with each board drawn up tight and securely nailed at each stud or bearing point. Jointing shall occur over the center of and parallel to the studs.

   **Note.**—End-matched (T. & G.) boards may be used for sheathing provided no two adjoining boards break joints over the same stud space, and each board shall bear on at least two studs.

12. Wood sheathing used in connection with stucco finish shall be applied horizontally and the frame shall be braced as described in Paragraph 10 above.

13. When shingles are applied over other than wood sheathing boards, 1 x 4 inch nailing strips shall be used, nailed to the studs over the building paper and spaced according to the shingle exposure.

14. Wood sheathing boards shall be installed and laid closed under rigid shingle sliding where the shingle butt thickness is less than 3/8 inch.

15. All exterior finish shall be backed up with water-resisting building paper or saturated asphalt felt and shall be applied over all types of sheathing without exception. Each lap shall be not less than 4 inches with at least a 4-inch lap on the water-resisting material around openings. All exterior openings in frame walls shall have strips of water-resisting building paper or saturated asphalt felt installed behind the exterior trim.

16. Studs in exterior frame walls may run from sill to roof line provided they do not exceed 20 feet in length. Studs shall be in continuous lengths without splicing. Floor joists supported on exterior frame walls shall bear on 1 by 6 inch ribbons let into the inside face of the studs. Joists bearing on ribbons shall be securely nailed to the studs. Where the wall height exceeds 20 feet, a doubled 2 x 4 inch bearing plate shall be installed continuous at the second floor level.

C. Interior Partitions

1. All bearing partition studs shall be not less than 2 x 4's spaced not more than 16 inches o. c. set the 4-inch way.

2. Nonbearing partition studs may be 2 x 3's spaced 16 inches o. c. set the 2-inch way or 2 x 3's spaced 16 inches o. c. set the 3-inch way for walls around closets and chimneys, for walls not exceeding 6 feet of unsupported length which contain openings, and for walls exceeding 6 feet provided they are devoid of openings.

3. All openings in interior bearing partitions shall have jamb and heads double-framed same as required for exterior openings. Jambs and heads of openings in nonbearing partitions shall be 2 x 4's doubled.
4. The top plates of all bearing partitions shall be doubled. All partition plates shall lap at all intersecting partitions and at outside walls, and shall be securely spiked.

5. When partitions frame on top of the joists or subfloor, the studs shall bear on a sole plate at least 2 inches thick.

6. Where nonbearing partitions run parallel to the second floor joists, a lathing member shall be placed above the partition plate and shall be wide enough to provide nailing surface for ceiling lath.

7. Wood bearing partitions in cellars or basements will not be acceptable.

8. No stud shall be cut more than half its depth to receive piping and duct work. If more depth is required, the partition studs shall be increased accordingly. Where the running of piping and duct work necessitates the cutting of plates, proper provision, acceptable to the Phoenix Underwriting Office, shall be made for tying together and supporting all structural members affected by such cutting.

9. Corners for all rooms shall be framed solid for lath or other interior finish.

10. All interior partitions connecting to masonry walls shall have the end stud anchored to the masonry with not less than three 1/2-inch bolts in each story height.

D. Stairs

1. Main stairways shall have not less than 6 feet 8 inches continuous clear headroom measured vertically from the front edge of the tread to a line parallel to the stair run.

2. In figuring the stair run, the treads shall be not less than 9 inches wide, risers shall be not more than 81/4 inches high, and tread shall be so proportioned to riser that an easy run is obtained. The width of tread, including the nosing, shall be not less than 101/4 inches.

3. The cutting and framing of all structural members such as stringers and landings shall be such that the development of their full strength will not be impaired. Stringers shall have solid bearing at top and bottom. The minimum effective depth of wooden stair stringers shall be 31/2 inches.

4. If winders are used, the width of treads at 18 inches from the converging end shall be not less than the tread width on the straight stair run. All risers shall be the same height for each story.

5. Open basement stairs shall have stringers not less than 2 inches thick. If treads are less than 11/8 inches thick, a third stringer shall be installed.

MISCELLANEOUS

1. Caulking will be required around all exterior openings in masonry or masonry veneer walls and at other intersections of wood and masonry where considered necessary to make weathertight.

2. Fire stops shall be provided in partitions and outside stud walls at first floor and at attic, which shall cut off completely all openings. Approved masonry or wood blocks cut in solidly, or other approved methods will be acceptable.

3. Where showers occur over bathtubs, the walls above the tubs for a height of at least 6 feet from the bathroom floor shall be finished with a water-proof material. Recessed bathtubs shall be sup-
ported at the rim on metal supports or wood blocks securely anchored to the stud frame.

4. The following requirements in making attached or built-in garages fire-resistant shall apply:

   (a) Where an attached garage adjoins a frame dwelling, the common wall in the garage shall be covered with metal lath and \( \frac{3}{4} \)-inch portland cement plaster or a covering of equivalent fire-resistant material and all openings between studs and joists framing into the common wall shall be completely firestopped. Where habitable rooms occur over the garage, the garage ceiling and all walls shall be similarly covered.

   (b) All walls and ceilings of built-in garages shall be covered with fire-resistant material and firestopped same as required in (a).

   (c) All wood doors in opening between garage and main dwelling shall be covered with sheet metal on the garage side.

5. The following requirements for making heater rooms fire-resistant shall apply:

   (a) All wood construction of walls, partitions, and ceiling shall be covered with metal lath and \( \frac{3}{4} \)-inch portland cement plaster or a covering of equivalent fire-resistant material.

   (b) All wood doors in heater rooms shall be covered with sheet metal on the heater room side.

TERMITE PREVENTION

1. When protection against infestation by termites is necessary, it shall be attained by the following means which are listed in the order of their desirability.

   (a) Continuous noncorrodible sheet metal termite shields with tight seams or soldered joints; or

   (b) Lumber treated with wood preservatives for all wood construction in contact with foundation walls and all first floor framing. The following methods of treating lumber with preservatives are acceptable, listed in the order of their preference:

      (1) Full-cell or empty-cell (vacuum-pressure) process.

      (2) Hot-and-cold bath process.

      The chemicals used as preservatives in both methods must be those which have withstood actual tests over a period of years and the methods of treatment shall be approved by the Phoenix Underwriting Office.

      Note.—Brush coat, spraying, or dipping methods of treatment will not be acceptable.

2. In localities where, in the opinion of the Phoenix Underwriting Office, full protection is necessary, protection shall be obtained by both (a) and one of the methods under (b) as listed in Paragraph 1 above.
3. When protection against termites is required, noncorrodible metal termite shields shall be installed around all pipes entering the ground and those which are less than 18 inches above the ground.

**ROOF COVERINGS**

1. Tile, slate, asbestos-cement and asphalt shingle roofs shall be installed according to the manufacturer's directions.

2. Roof sheathing shall be covered with saturated asphalt roofing felt of the following weights:
   (a) Not less than 30 pounds per square under tile, asbestos-cement shingle or slate roofs.
   (b) Not less than 30 pounds per square under asphalt shingles where less than double thickness occurs at any point.
   (c) Not less than 15 pounds per square under asphalt shingles where double thickness is obtained at all points.

   **Note.**—No felt will be required where triple thickness asphalt shingles is obtained at all points nor under wood shingles.

3. Asphalt shingles shall bear Fire Underwriters' Class "C" label, and shall be of the following minimum weight:
   - Square butt strip shingles: 210 lbs. per square.
   - Individual shingles: 250 lbs. per square.
   - Hexagon strip singles: 165 lbs. per square.

   **Note.**—The minimum pitch for asphalt shingle roofs shall be 4 inches in 12 inches. A double starting row shall be used on shingle installations.

4. When slate is installed, exposure shall not exceed the following:
   - 14-inch slate—not over 5 1/2 inches to the weather.
   - 16-inch slate—not over 6 1/2 inches to the weather.
   - 18-inch slate—not over 7 1/2 inches to the weather.

5. Asbestos-cement shingles and tiles shall be applied with exposures as recommended by the manufacturers.

6. Built-up asphalt and tar and gravel coverings for flat roofs shall be applied according to manufacturer's directions and shall carry the regular manufacturer's guarantee for the type of roof used. The guarantee shall be for a period of not less than 10 years.

7. Wood shingles shall be edge-grain tapered shingles, minimum thickness, 5 butts in 2 inches.

8. Wood shingle exposure to the weather shall not exceed the following:

   **Maximum wood-shingle exposures**

<table>
<thead>
<tr>
<th>Roof shingle exposure (in inches)</th>
<th>Side wall shingle exposure (in inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pitch of roof</td>
<td>shingle length (in inches)</td>
</tr>
<tr>
<td>rise</td>
<td>16</td>
</tr>
<tr>
<td>run</td>
<td>16</td>
</tr>
<tr>
<td>thickness of courses</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rise</th>
<th>Run</th>
<th>16</th>
<th>18</th>
<th>24</th>
<th>16</th>
<th>18</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 to 7</td>
<td>12</td>
<td>3/4</td>
<td>4/4</td>
<td>5/4</td>
<td>7/4</td>
<td>8/4</td>
<td>11</td>
</tr>
<tr>
<td>7 to 18</td>
<td>12</td>
<td>5</td>
<td>6 5/2</td>
<td>7</td>
<td>12</td>
<td>14</td>
<td>16</td>
</tr>
</tbody>
</table>

1 Exposed course shall be face-nailed.

**Note.**—A double starting row shall be used on shingle installations.

**Note.**—Wood shingles on roofs with pitch of less than 4 to 12 shall be used on open porches only.
9. Other types of roof coverings such as sheet metal, canvas, etc., may be used when the type and weight of the material and methods of application are approved by the Phoenix Underwriting Office.

**SHEET METAL**

1. All built-in flashing and counterflashing over heads of openings, around chimneys, at intersections of roofs and walls, valleys, and at horizontal and vertical intersections of stucco with other material shall be of corrosion-resisting metal.

2. For valleys in connection with asphalt shingle roofs, two thicknesses of mineral surfaced roll-roofing material cut from rolls weighing not less than 85 pounds per square, may be used. Strips shall be not less than 18 inches wide.

3. All sheet metal shall be of the following minimum weight or gauge:
   
   (a) Copper: 14-ounce.
   (b) Tin: 40-pound block tin coating.
   (c) Galvanized sheet metal: 26 gauge sheets with 2-ounce zinc coating per square foot.
   (d) Zinc: As recommended by manufacturers.
   (e) Lead: Sheet lead—2½ pounds per square foot.

4. Flashing and counterflashing at parapet walls in connection with flat roofs may be of same material as roof coverings. All flat roofs, except where metal base flashing is used, shall have a 45-degree cant strip at all roof intersections with parapet and vertical walls.

5. All chimneys shall have corrosion-resisting metal counterflashing built in on all sides at intersection with roof.

6. When gutters and leaders are installed, they shall be corrosion-resisting metals. Crickets shall be covered with corrosion-resisting sheet metal.

**LATHING**

1. Wood lath shall be 5/16-inch thick No. 1 lath; spaced not less than 1/4 inch nor more than 3/8 inch apart, nailed at each bearing, and joints shall be broken every 7th lath. Lath extending continuous behind intersecting partitions and walls will not be acceptable.

2. Metal lath shall be not less than the following:
   
   (a) Expanded metal lath—
      
      (1) For stud walls, studs 16 inches o. c. or less: 2.5 pounds per square yard.
      (2) For ceilings, joists spacing up to 20 inches: 3.4 pounds per square yard, or flat ribbed metal lath 2.75 pounds per square yard.
      (3) For exterior plaster: 3.4 pounds per square yard.

   Note.—Expanded metal lath used as base for interior plaster shall be either painted or galvanized.

   (b) Woven galvanized wire lath, No. 18-gauge wire, weight 3.2 pounds per square yard.

   (c) Paper backed galvanized wire lath: Maximum wire spacing 2 inches o. c.
      
      (1) For interior plaster: Weight 2.3 pounds per square yard.
(2) For exterior stucco: Weight 3.1 pounds per square yard.
(d) Stucco Mesh: Welded or woven wire hexagonal mesh fabric will be acceptable when sheathing is not used, if the mesh is applied over reinforced waterproof building paper or over 18-gauge galvanized wire which is spaced 6 inches o.c., stretched taut horizontally, and covered with waterproof building paper approved by the Phoenix Underwriting Office, or 15-pound saturated asphalt felt. Gauge and mesh sizes shall be as follows:
(1) No. 17 gauge wire: 1 3/4-inch mesh maximum.
(2) No. 18 gauge wire: 1-inch mesh maximum.
Metal lath furring strips at least 4 inches wide shall be applied around all openings and over corners as furring under stucco mesh.

3. All intersections of walls at corners and at ceilings shall be lathed with metal lath corner strips not less than 6 inches wide—3 inches on each surface.
4. When metal lath is used as a base for exterior plaster, the lath shall be held at least 3/8 inch away from sheathing by use of furring nails, wood furring strips, or self-furring lath.
5. When metal lath, except paper backed metal lath, is applied to solid wood surfaces such as wood beams, lintels, girders, etc., the surface shall be covered with waterproofed paper before the metal lath is applied. Furring nails or strips shall be provided for fastening of metal lath.
6. Insulating fiber board lath and gypsum board lath shall not exceed 18 by 48 inches and shall be applied according to manufacturer's directions.

INTERIOR PLASTER WORK
1. All interior plaster when applied to lath base shall be not less than 2-coat work and shall have a minimum thickness of 1/2 inch over the lath base.
2. All plaster shall be mixed and applied exactly according to manufacturer's directions.
3. All lime used for plastering shall be thoroughly slaked.
4. If hydrated lime or patent plasters are used, they shall be mixed and applied according to manufacturer's directions.
5. All plaster ceilings shall be level. All walls and corners shall be plumb and straight.

EXTERIOR PLASTER OR STUCCO

Note.—See "Lathing" for application of stucco on metal lath.
1. Metal lath shall be wholly embedded in the stucco.
2. Exterior plaster shall have a base of portland cement or other approved material and when applied over the other masonry shall be 3-coat work.
3. At least 10 days shall elapse between the application of each coat.
4. First and second coats shall be composed of 1 part portland cement, 4 parts well-graded clean sand, and hydrated lime equal to 10 percent of cement by volume. First coat shall be applied to a minimum thickness of \( \frac{3}{8} \) inch and scratched. Keep damp for at least 3 days, then allow to dry. After scratch coat is dry, moisten surface thoroughly and evenly and immediately apply the second coat to at least \( \frac{3}{8} \)-inch thickness and rod straight and true in every direction. Keep second coat damp for at least 3 days and then allow to dry thoroughly. Moisten surface evenly and thoroughly just before adding third coat.

5. Third coat shall be as required for first coat, or an approved brand of prepared stucco, trowel-applied to bring total thickness to not less than \( \frac{7}{8} \) inch. Desired finish texture shall be obtained in this coat which shall be protected from too rapid drying for at least 3 days. If desired, a color or waterproofing coat may be added.

6. Exterior plaster shall be applied on a metal lath or masonry base.

7. No stucco shall be applied when the temperature is less than 40 degrees Fahrenheit.

PAINTING

1. All millwork shall receive prime coat before or immediately after installation. When wood siding is used, seal ends before erection.

2. All nail holes, cracks, etc., shall be puttied full and smooth. Putty shall be applied after the priming coats on surfaces which are to be painted or enameled. Putty shall be tinted to match woodwork on all stained and varnished finishes. All knots, pitch pockets, and sap streaks shall be shellacked before paint is applied.

3. All exterior woodwork shall receive not less than 3 coats of paint including the prime coat. In lieu of this treatment, stain or penetrating oil may be used provided equal protection is obtained in a manner approved by the Phoenix Underwriting Office.

4. All masonry and concrete walls to be painted shall receive 2 brush coats of paint especially prepared for painting masonry or concrete surfaces.

5. Where varnish is used for exterior, the varnish shall be a good grade of spar varnish.

6. All exterior and interior structural iron work, and ornamental iron work if to be painted, shall have at least one coat of paint in addition to shop coat. Paint shall be lead and oil, graphite, or any specially prepared paint which is recommended by the manufacturers for painting iron work.

7. All interior trim and all sash shall be stained, painted, varnished, or waxed.

8. The following types of interior finish give in a general way the minimums which will be acceptable:

   (a) Wood, if painted: 3 coats.

   (b) Wood, if stained:
   
   (1) Stain and one coat of varnish.
   
   (2) Stain and one coat of wax.
(c) Natural wood, unstained:
   (1) Open grain wood: 1 coat filler, 2 coats varnish.
   (2) Close grain wood: 2 coats varnish.
   (3) 2 coats wax.

(d) Floors:
   (1) 2 coats wax or wax stain.
   (2) 1 coat filler, 1 coat shellac, varnish or lacquer, 1 coat wax.
   (3) 1 coat filler, 1 coat shellac, 1 coat varnish.
   (4) 1 coat filler, 2 coats varnish.
   (5) 2 coats floor paint (enamel), 1 coat wax.
   (6) Cement: 2 coats floor paint (enamel), 1 coat wax.

(e) Walls and ceilings if decorated:
   (1) 1 coat of size, 2 coats paint with oil or varnish base.
   (2) 1 coat of size, wall covering (paper, etc.)
   (3) 1 coat of size and 1 coat of prepared cold water paint.

9. The above requirements for exterior and interior finish may be modified when specially prepared materials are used as recommended by the manufacturers and approved by the Phoenix Underwriting Office.

PLUMBING

1. The installation of all plumbing work shall comply with all requirements of the applicable local code, or the State or local Board of Health regulations. Where no local or State regulations exist, the requirements contained in “Recommended Minimum Requirements for Plumbing,” published by the National Bureau of Standards shall apply.

   Note.—Where public sewer and water supply systems are not available the Federal Housing Administration’s Property Standards requirements covering installation of private water supply and sewage disposal systems shall apply.

2. After final plumbing tests have been made, evidence showing approval by the local plumbing inspector will be required.

3. All materials shall be new sound stock of quality and weight specified.

4. In localities where freezing occurs, all pipes located in exterior walls shall be thoroughly insulated.

5. Storage equipment for domestic hot water supply with capacity of not less than 15 gallons shall be installed for each family unit. For each additional bathroom over one for each family unit, the capacity shall be increased 10 gallons.

   Note.—Automatic heaters of smaller storage capacity will be acceptable when, in the opinion of the Phoenix Underwriting Office, such heater will furnish an adequate supply of hot water to all fixtures.

6. Auxiliary heaters shall rest on concrete floor or other suitable fireproof base.

7. All piping, except drain lines and soil pipes, when located under concrete slabs on the ground, shall be installed to permit access for inspection and repair. Drain and soil lines shall have cleanouts at each turn of the pipe.
8. The specifications shall contain descriptions of all plumbing fixtures. Manufacturer's name and catalog plate number will be considered adequate description.

HEATING

1. The installation of the heating system shall comply with all rules and regulations of the National Board of Fire Underwriters and with all applicable local laws and ordinances pertaining thereto. All work shall comply with such regulations and any work not conforming to those requirements shall be corrected.

2. All gas fired heating and domestic hot water equipment shall conform to the standards established by the American Gas Association.

3. Heating equipment shall be installed in accordance with manufacturer's instructions except when these instructions conflict with local regulations.

4. All equipment and materials shall be of standard stock, in sound condition and shall be installed by experienced workmen familiar with the installation of the type of heating system to be used.

5. The heating system shall be of such capacity that under normal operation it will produce and maintain a temperature of not less than 70 degrees Fahrenheit within all habitable rooms when the outdoor temperature is 30 degrees above zero Fahrenheit.

ELECTRICAL WORK

A. General.

1. The installation of all electrical work including equipment shall comply with all laws applying to electrical installations in effect in the local community, or with the regulations of the National Electrical Code in the absence of such laws, and with the regulations of the electric utility company.

2. After completion of the work, evidence shall be furnished showing compliance with such laws and regulations.

3. All materials used shall be new and shall conform to the standards established by the Underwriters' Laboratories, Inc.

B. Service.

1. Wires from the outside service connection to the distribution panel shall be No. 8 gauge or larger.

C. Branch Circuits.

1. Minimum wire size shall be No. 14 gauge. Where the distance from the distribution panel to the outlets is great, or where any outlet or series of outlets on a circuit is likely to cause an excessive load, No. 12 gauge wire or a size adequate for the load to be carried shall be installed.

2. All convenience outlets located in kitchen, pantry, breakfast room, dining room and laundry shall be wired with not smaller than No. 12 gauge wire.
D. Appliance Circuits.

1. Where electric ranges, heaters, oil burners, stokers, or other "heavy duty" equipment is to be installed, wire shall be of adequate size for the load to be carried, with no reduction in size between the appliance and the distribution panel, and not less than as specified in the following table:

<table>
<thead>
<tr>
<th>Kind of appliance</th>
<th>Number of wires</th>
<th>Minimum size of wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td>3</td>
<td>No. 8</td>
</tr>
<tr>
<td>Heater</td>
<td>2</td>
<td>No. 10</td>
</tr>
<tr>
<td>Oil burner or stoker</td>
<td>2</td>
<td>No. 12</td>
</tr>
<tr>
<td>Other small motors</td>
<td>2</td>
<td>No. 12</td>
</tr>
</tbody>
</table>

Note.—In solid masonry walls, rigid conduit shall be used.

GENERAL

1. No minimum requirements are applied to interior finish such as trim, flooring, tile work, etc. The choice of such materials will be left to the architect, owner, or builder. It is understood that the material and workmanship shall be of standard equal to the best practices for the type and kind of building being erected.

2. It must be thoroughly understood that the valuation and tentative rating of the property are based on the provisions of the specifications and drawings together with these Minimum Construction Requirements, and that any deviation from their provisions without first obtaining approval from the Phoenix Underwriting Office may affect the amount of loan committed on, or affect the term of the mortgage and the final property rating.