APPENDIX N

LOW-RISE MULTIPLE-FAMILY DWELLING CONSTRUCTION

SECTION AN101
SCOPE

AN101.1 Scope. The provisions of this appendix, and other applicable provisions of this code, shall apply to the construction, alteration, enlargement, replacement, repair, equipment, use and occupancy and location of low-rise residential multiple-family dwellings and their accessory structures.

The requirements of this appendix apply to:

1. Structures containing more than two dwelling units and classified as Group R-2 nontransient apartment house occupancies as defined in the *Oregon Structural Specialty Code.*
2. Structures that are three stories or less above grade; and
3. Structures that have an exterior door for each dwelling unit; and
4. Structures that contain at least three, but not more than 24 dwelling units; and
5. Structures that are 36,000 square feet (279 m^2) or less in area; and
6. Covered multiple-family dwellings as defined in ORS 447.210(5) in which there is no elevator; and
7. Structures or portions of structures that are used exclusively as dwellings and are not mixed occupancies as defined in Section 303.3 of the *Oregon Structural Specialty Code*.

   Exceptions:

   1. A low-rise residential multiple-familydwelling may contain communal laundry rooms, storage rooms and similar incidental use areas.
   2. Low-rise residential multiple-familydwellings may have attached Group U private residential parking garages and attached carports. The area of a single garage and/or carport, or the cumulative area of multiple attached garages and/or carports is limited to 3,000 square feet (279 m^2) or less.

      Detached private residential parking garages with either a single or cumulative area of 3,000 square feet (279 m^2) of less and classified as a Group U occupancy as defined in the *Oregon Structural Specialty Code* may be designed and constructed using this appendix.
8. The requirements of this appendix also apply to conventional light-frame structures designed and constructed using the prescriptive provisions of this code; or the American Forest and Paper Association (AF&PA) *Wood Frame Construction Manual for One- and Two-Family Dwellings* (WCFM); or the design provisions of Appendix P; or the design provisions of the *Oregon Structural Specialty Code*.

   Exception: Structures of conventional light-frame wood construction may contain structural design elements or may be designed entirely using Appendix S.

   The requirements of this appendix do not apply to structures that contain sleeping units or a mixture of sleeping units and dwelling units and not classified as a Group R-3 occupancy as defined in the *Oregon Structural Specialty Code*. These uses include but shall not be limited to:

   Boarding houses
   Convents
   Dormitories
   Fraternities and sororities
   Hotels
   Motels
   Monasteries

AN101.2 Duties and powers of the building official. See Section R104.

AN101.2.1 Alternative materials, design and methods of construction and equipment. See Section R104.11.

AN101.3 Permits. Permits shall be applied for and issued according to the requirements of this section. Permits shall not be required for the following:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 120 square feet (11.15 m^2).
2. Fences not over 6 feet (1829 mm) high.
3. Oil derricks.
4. Retaining walls which are not over 4 feet (1219 mm) in height measured from the bottom of the footing to the top of the wall, unless supporting a surcharge or impounding Class I, II or III-A liquids.
5. Water tanks supported directly on grade if the capacity does not exceed 5,000 gallons (18,925 L) and the ratio of height to diameter or width does not exceed 2:1.
6. Platforms, sidewalks and driveways not more than 30 inches (762 mm) above grade and not over any basement or story below and which are not part of an accessible route.
7. Painting, papering, tiling, carpeting, cabinets, counter tops and similar finish work.
8. Prefabricated swimming pools which are less than 24 inches (610 mm) deep, do not exceed 5,000 gallons (18 925 L) and are installed entirely above ground.
9. Window awnings supported by an exterior wall which do not project more than 54 inches (1372 mm) from the exterior wall and do not require additional support.

Unless otherwise exempted, separate plumbing, electrical and mechanical permits may be required for the above exempted items.

Exemption from the permit requirements of this code shall not be deemed to grant authorization for any work to be done in any manner in violation of the provisions of this code.

AN101.4 Construction documents. Construction documents shall comply with the requirements of Section R106 and this appendix.

AN101.4.1 Plans for apartments, condominiums, townhouses, rowhouses and attached private residential garages, carports or sheds shall indicate how required structural and fire-resistive integrity will be maintained where penetrations into or through fire-resistive-rated construction will be made for electrical, mechanical, plumbing, and communication conduits, pipes and similar systems.

Plans for building designed and constructed using the provisions of this appendix shall contain a statement on the cover sheet clearly identifying that the structures has been designed and constructed using the provision of this code. This statement shall be maintained as a permanent record in the files of the code enforcement agency.

AN101.4.2 State fire and life safety plan review. ORS 479.155(2) requires submission of plans for certain types of construction unless exempted by the Building Codes Division.

ORS 479.155(2), in part, is not part of this code but is reproduced here for the reader's convenience.

> **479.155(2)** Prior to construction or alteration of a hospital, public building as defined in ORS 479.010 (1) public garage, dry cleaning establishment, apartment house, hotel, bulk oil storgage plant, school institution as defined in ORS 479.210 or any other building or structure regulated by the State Fire Marshal for use and occupancy or requiring approval by the State Fire Marshal pursuant to statute, the owner shall submit to the director two copies of a plan or sketch showing the location of the building or structure with relation to the premises, distances, lengths, and details of construction as the director shall require. Such filing shall not be required with respect to any such building or structure in any area exempted by order of the State Fire Marshal and shall satisfy any statutory provision requiring approval by the State Fire Marshal.

As defined in this code, the following occupancies with areas and heights specified are required to satisfy ORS 479.155(2). The following provisions shall apply in all municipalities unless exempted by the Building Codes Division through delegation of the fire and life safety plan review program.

The owner shall submit to the building codes administrator two copies (or, when required, an additional copy shall be submitted for local government use) of a plan or sketch drawn clearly and to scale showing information as set forth in Section AN101.4.1 prior to construction or alteration of:

1. Apartments, condominiums, townhouses, and rowhouses with an aggregate area over 4,000 square feet (372 m^2) or more than 20 feet (6096 mm) in height or with a basement over 1,500 square feet (139 m^2).
2. Private residential parking garages, carports or sheds over 4,000 square feet (372 m^2) or more than 20 feet (6096 mm) in height or with a basement.

Note: Two copies of a plot plan for the occupancies listed above shall be submitted for the placing of prefabricated structures to show the relationship of all adjacent buildings and their exitways.

AN101.4.3 Design professional in responsible charge.

AN101.4.3.1 General. When it is required that documents be prepared by a registered design professional, the building official shall be authorized to require the owner to engage and designate on the building permit application a registered design professional who shall act as the registered design professional in responsible charge. If the circumstances require, the owner shall designate a substitute registered design professional in responsible charge who shall perform the duties required of the original registered design professional in responsible charge. The building official shall be notified in writing by the owner if the registered design professional in responsible charge is changed or is unable to continue to perform the duties.

The registered design professional in responsible charge shall be responsible for reviewing and coordinating submittal documents prepared by others, including phased and deferred submittal items, for compatibility with the design of the building.

Where structural observation is required by Section AN101.6.1 and Section 1709 of the *Oregon Structural Specialty Code*, the inspection program shall name the individual or firms who are to perform structural observation and describe the stages of construction at which structural observation is to occur (see also duties specified in Section 1704 of the *Oregon Structural Specialty Code*).

AN101.4.3.2 Deferred submittals. For the purposes of this section, deferred submittals are defined as those portions of the design that are not submitted at the time of the application and that are to be submitted to the building official within a specified period.

Deferral of any submittal items shall have the prior approval of the building official. The registered design professional in responsible charge shall list the deferred submittals on the construction documents for review by the building official.

Documents for deferred submittal items shall be submitted to the registered design professional in responsible charge who shall review them and forward them to the building official with a notation indicating that the deferred submittal documents have been reviewed and been found to be in general conformance to the design of the building. The deferred submittal items shall not be installed until the design and submittal documents have been approved by the building official.

AN101.5 Fees. Fees shall be calculated and assessed in accordance with Section R108 or the jurisdiction's adopted fee schedule.

AN101.6 Inspections. Inspections shall be performed in accordance with Section R109 and this section.

1. Lath and gypsum board inspections. Lath or gypsum board inspections are required for these buildings after all lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.

   Exception: Gypsum board that is not part of a fire-resistance-rated assembly or a shear assembly.

2. Fire-resistant penetrations. Protection of joints and penetrations in fire-resistance-rated assemblies shall not be concealed from view until inspected and approved.
3. Energy efficiency inspection. Inspections shall be made to determine compliance with Chapter 13 and shall include, but not be limited to, inspections for: envelope insulation *R*- and *U*-values, fenestration *U*-value, duct system *R*-value, and HVAC and water-heating equipment efficiency.
4. Special inspections. For special inspections, see Section AN101.6.1
5. Other inspections. In addition to the inspections specified above, the building official is authorized to make or require other inspections of any construction work to ascertain compliance with the provisions of this chapter and other laws that are enforced by the building official.

AN101.6.1 Special inspections and structural observations. When required by this section and Chapter 17 of the *Oregon Structural Specialty Code*, special inspections and structural observations shall meet the requirements of AN101.4.3.1 and Chapter 17 of the *Oregon Structural Specialty Code*.

Special inspections shall be required for:

1. Fabricated steel structural components.
2. Welding of fabricated steel components, structural steel and reinforcing steel.
3. Verification of structural steel details.
4. High-strength bolting.
5. Concrete with a structural design based on fc' greater than 2,500 pounds per square inch.
6. Masonry construction in accordance with the *Oregon Structural Specialty Code* Sections 1704.5 and 1617.6.
7. Open construction prefabricated wooden structural elements and assemblies. See Section 1704.6 in the *Oregon Structural Specialty Code*.
8. Soils when required by the Oregon Structural Specialty Code Sections 1704.7 and 1802.
9. Exterior and interior architectural wall panels and the anchoring of masonry veneers in accordance with the *Oregon Structural Specialty Code* Sections 1704.10 and 1616.3.
10. Sprayed fire-resistant materials. See *Oregon Structural Specialty Code* Section 1704.11.

AN101.7 Certificate of occupancy. See Section R110.

SECTION AN102
DEFINITIONS

AN102.1 General. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. The definitions provided in Section R202 shall also be applicable to this appendix.

AN102.2 Definitions.

ACCESSIBLE MEANS OF EGRESS. A continuous and unobstructed way if egress travel from any point in a building or facility that provides an accessible route to an area of refuge, a horizontal exit or a public way.

ALLEY. See "Public way."

ANNULAR SPACE. The opening around the penetrating item.

APARTMENT HOUSE. Any dwelling or portion thereof located on a single lot in which that contains three or more dwelling units and the units are rented, leased, let or hired out to be occupied on a nontransient basis.

AREA, BUILDING. The area included within surrounding exterior walls (or exterior walls and fire walls) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above.

AUTOMATIC. As applied to fire protection devices, is a device or system providing an emergency function without the necessity for human intervention and activated as a result of a predetermined temperature rise, rate of temperature rise or combustion products.

AUTOMATIC SPRINKLER SYSTEM. A sprinkler system, for fire protection purposes, is an integrated system of underground and overhead piping designed in accordance with fire protection engineering standards. The system includes a suitable water supply. The portion of the system above the ground is a network of specially sized or hydraulically designed piping installed in a structure or area, generally overhead, and to which automatic sprinklers are connected in a systematic pattern. The system is usually activated by heat from a fire and discharges water over the fire area.

BOARDING HOUSE. A building arranged or used for lodging for compensation, with or without meals, and not occupied as a single-family unit.

CEILING RADIATION DAMPER. A listed device installed in a ceiling membrane of a fire-resistance-rated floor/ceiling or roof/ceiling assembly to limit automatically the radiative heat transfer through an air inlet/outlet opening.

COMBINATION FIRE/SMOKE DAMPER. A listed device installed in ducts and air transfer openings designed to close automatically upon the detection of heat and to also resist the passage of air and smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required, is capable of being positioned from a remote command station.

COMMON PATH OF EGRESS TRAVEL. That portion of the exit access which the occupants are required to traverse before two separate and distinct paths of egress travel to two exits are available. Paths that merge are common paths of travel. Common paths of egress travel shall be included within the permitted travel distance.

CONDOMINIUM. A residential multiple-family dwelling or portion thereof located on a single lot that contains dwelling units, which are owner-occupied or rented, leased, let or hired out to be occupied on a nontransient basis. A condominium association typically owns the multiple-family dwelling but the dwelling units are individually owned. Property maintenance and liability requirements are mandated by use of a condominium agreement or similar legal instrument in accordance with ORS 100.

CONVENTIONAL LIGHT-FRAME WOOD CONSTRUCTION. A type of construction whose primary structural elements are formed by a system of repetitive wood-framing members.

CORRIDOR. An enclosed exit access component that defines and provides a path of egress travel to an exit.

COVERED MULTIPLE-FAMILY DWELLINGS. Multiple-family dwellings "covered" by (included in the scope of) ORS 447.210.(5).

> **ORS 447.210(5)** is not part of this code but is reproduced here for the reader's convenience.
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> **ORS 447.210(5)** "Covered multifamily dwellings" means buildings consisting of four or more dwelling units if such buildings have one or more elevators, and ground floor dwelling units in other buildings consisting of four or more dwelling units. Dwelling units within a single structure separated by firewalls do not constitute separate buildings.

DAMPER. See "Ceiling radiation damper," "Combination fire/smoke damper," "Fire damper" and "Smoke damper."

DOOR, EXTERIOR. A door located on an exterior perimeter wall or in an alcove opening onto a yard or court and is located directly at grade or is served by an exterior stair if located on a floor above grade.

DORMITORY. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories or fraternity houses.

EGRESS COURT. A court or yard that provides access to a public way for one or more exits.

EXISTING STRUCTURE. A structure erected prior to the date of adoption of the appropriate code, or one for which a legal building permit has been issued.

EXIT. That portion of the means of egress system which is separated from other interior spaces of a building or structure by fire-resistive construction and opening protectives as required to provide a protected path of egress travel between the exit access and the exit discharge. Exits include exterior exit doors at ground level.

EXIT ACCESS. That portion of a means of egress system that leads from any occupied portion of a building or structure to an exit.

EXIT DISCHARGE. That portion of a means of egress system between the termination of an exit and a public way.

EXIT DISCHARGE, LEVEL OF. The horizontal plane located at the point at which an exit terminates and an exit discharge begins.

EXTERIOR EXIT BALCONY. A balcony, landing or porch, projecting from the wall of a building and serves as an exit discharge component in a means of egress system.

EXTERIOR SURFACES. Weather-exposed surfaces.

EXTERIOR WALL. A wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees (1.05 rad) or greater with the horizontal plane.

EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, exterior insulation and finish systems, architectural trim and embellishments such as cornices, soffits, facias, gutters and leaders.

F-RATING. The time period that the through-penetration firestop system limits the spread of fire through the penetration when tested in accordance with ASTM E 814.

FABRICATED ITEM. Structural, load-bearing or lateral load-resisting assemblies consisting of materials assembled prior to installation in a building or structure, or subjected to operations such as heat treatment, thermal cutting, cold working or reforming after manufacture and prior to installation in a building or structure. Materials produced in accordance with standard specifications referenced by this code, such as rolled structural steel shapes, steel reinforcing bars, masonry units and plywood sheets, shall not be considered fabricated items.

FIRE AREA. The aggregate floor area enclosed and bounded by firewalls, fire barriers, exterior walls or fire-resistance-rated horizontal assemblies of a building.

FIRE BARRIER. A fire-resistance-rated vertical or horizontal assembly of materials designed to restrict the spread of fire in which openings are protected.

FIRE DAMPER. A listed device, installed in ducts and air transfer openings of an air distribution system or smoke control systems, designed to close automatically upon detection of heat, to interrupt migratory airflow, and to restrict the passage of flame. Fire dampers are classified for use in either static systems that will automatically shut down in the event of a fire, or in a dynamic system that continues to operate during a fire. A dynamic fire damper is tested and rated for closure under airflow.

FIRE DOOR. The door component of a fire door assembly.

FIRE DOOR ASSEMBLY. Any combination of a fire door, frame, hardware, and other accessories that together provide a specific degree of fire protection to the opening.

FIRE FLOW. The flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kpa) residual pressure, that is available for fire-fighting water supply.

FIRE-FLOW CALCULATION AREA. The floor area, in square feet (m^2), used to determine the required fire flow.

FIRE PARTITION. A vertical assembly of materials designed to restrict the spread of fire in which openings are protected.

FIRE PROTECTION RATING. The period of time that an opening protective assembly will maintain the ability to confine a fire as determined by tests prescribed in Section 715. Ratings are stated in hours or minutes.

FIRE PROTECTION SYSTEM. Approved devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

FIRE RESISTANCE. That property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases or flames under conditions of use.

FIRE-RESISTANCE RATING. The period of time a building element, component or assembly maintains the ability to confine a fire, continues to perform a given structural function, or both, as determined by the tests, or the methods based on tests, prescribed in Section 703.

FIRE-RESISTANT JOINT SYSTEM. An assemblage of specific materials or products that are designed, tested, and fire-resistance rated in accordance with either ASTM E 1966 or UL 2079 to resist for a prescribed period of time the passage of fire through joints made in or between fire-resistance-rated assemblies.

FIRE WALL. A fire-resistance-rated wall having protected openings, which restricts the spread of fire and extends continuously from the foundation to or through the roof, with sufficient structural stability under fire conditions to allow collapse of construction on either side without collapse of the wall.

FIRE WINDOW ASSEMBLY. A window constructed and glazed to give protection against the passage of fire.

FIREBLOCKING. Building materials installed to resist the free passage of flame to other areas of the building through concealed spaces.

FLOOR AREA, GROSS. The floor area within the inside perimeter of the exterior walls of the building under consideration, exclusive of vent shafts and courts, without deduction for corridors, stairways, closets, the thickness of interior walls, columns or other features. The floor area of a building, or portion thereof, not provided with surrounding exterior walls shall be the usable area under the horizontal projection of the roof or floor above. The gross floor area shall not include shafts with no openings or interior courts.

FLOOR AREA, NET. The actual occupied area not including unoccupied accessory areas such as corridors, stairways, toilet rooms, mechanical rooms and closets.

FLOOR FIRE DOOR ASSEMBLY. A combination of a fire door, a frame, hardware and other accessories installed in a horizontal plane, which together provide a specific degree of fire protection to a through opening in a fire-resistance-rated floor. See Section 712.4.6.

GRADE FLOOR OPENING. A window or other opening located such that the sill height of the opening is not more than 44 inches (1118 mm) above or below the finished ground level adjacent to the opening.

GROUP SR OCCUPANCY. A Special Residence Group SR occupancy includes, among others, the use of a building or structure, or a portion thereof, for residences where personal care is administered and assisted self-preservation may be required. Group SR occupancies are licensed by, or are subject to licensure by, or under the authority of the Oregon Department Human Services in accordance with ORS Chapter 418 or 443, or any other state agency.

GYPSUM BOARD. Gypsum wallboard, gypsum sheathing, gypsum base for gypsum veneer plaster, exterior gypsum soffit board, predecorated gypsum board or water-resistant gypsum backing board complying with ASTM C 36, C 79, C 475, C 514, C 630, C 931, C 960, C 1002, C 1047, C 1177, C 1178, C 1278, C 1395, or C 1396.

HISTORIC BUILDINGS. Buildings that are listed in or eligible for listing in the National Register of Historic Places, or designated as historic under an appropriate state or local law (see Section 3406).

INTERIOR FINISH. Interior finish includes interior wall and ceiling finish and interior floor finish.

INTERIOR FLOOR FINISH. The exposed floor surfaces of buildings including coverings applied over a finished floor or stair, including risers.

INTERIOR WALL AND CEILING FINISH. The exposed interior surfaces of buildings including, but not limited to: fixed or movable walls and partitions; columns; ceilings; and interior wainscotting, paneling or other finish applied structurally or for decoration, acoustical correction, surface insulation, structural fire resistance or similar purposes, but not including trim.

MEANS OF EGRESS. A continuous and unobstructed path of vertical or horizontal egress travel from any occupied portion of a building or structure to a public way. A means of egress consists of three separate and distinct parts: the exit access, the exit and the exit discharge.

MEMBRANE PENETRATION. An opening made through one side (wall, floor or ceiling membrane) of an assembly.

MEMBRANE-PENETRATION FIRESTOP. A material, device or construction installed to resist for a prescribed time period the passage of flame and heat through openings in a protective membrane in order to accommodate cables, cable trays, conduit, tubing, pipes or similar items.

MULTIPLE-FAMILY DWELLING. A building or structure that contains three or more dwelling units used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or that are occupied for living purposes, apartment houses, condominiums, congregate residences, townhouses and similar nontransient dwellings.

NOSING. The leading edge of treads of stairs and of landings at the top of stairway flights.

OCCUPANT LOAD. The number of persons for which the means of egress of a building or portion thereof is designed.

OCCUPIABLE SPACE. A room or enclosed space designed for human occupancy in which individuals congregate for amusement, educational or similar purposes or in which occupants are engaged at labor, and which is equipped with means of egress and light and ventilation facilities meeting the requirements of this code.

PENETRATION FIRESTOP. A through-penetration firestop or a membrane-penetration firestop.

RAMP. A walking surface that has a running slope steeper than one unit vertical in 20 units horizontal (5-percent slope).

SELF-CLOSING. As applied to a fire door or other opening, means equipped with an approved device that will ensure closing after having been opened.

SLEEPING UNIT. A room or space in which people sleep, which can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.

SMOKE ALARM. A single- or multiple-station alarm responsive to smoke and not connected to a system.

SMOKE DAMPER. A listed device installed in ducts and air transfer openings that is designed to resist the passage of air and smoke. The device is installed to operate automatically, controlled by a smoke detection system, and where required, is capable of being positioned from a remote command station.

SMOKE DETECTOR. A listed device that senses visible or invisible particles of combustion.

SPECIAL INSPECTION. Inspection as herein required of the materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with approved construction documents and referenced standards (see Section 1704).

STAIR. A change in elevation, consisting of one or more risers.

STAIRWAY. One or more flights of stairs, either exterior or interior, with the necessary landings and platforms connecting the individual flights to form a continuous and uninterrupted passage from one level to another.

STAIRWAY, EXTERIOR. A stairway that is open on at least one side, except for required structural columns, beams, handrails and guards. The adjoining open areas shall be either yards, courts or public ways. The other sides of the exterior stairway need not be open.

STAIRWAY, INTERIOR. A stairway not meeting the definition of an exterior stairway.

STAIRWAY, SPIRAL. A stairway having a closed circular form in its plan view with uniform section-shaped treads attached to and radiating from a minimum-diameter supporting column.

STRUCTURAL OBSERVATION. The visual observation of the structural system by a registered design professional for general conformance to the approved construction documents at significant construction stages and at completion of the structural system. Structural observation does not include or waive the responsibility for the inspection required by Section 109, 1704 or other sections of this code.

SUBSTANTIAL ALTERATION. Any alteration where the total costs of all alterations (including but not limited to electrical, mechanical, plumbing and structural changes) for a building or facility within any 12-month period amounts to 40 percent or more of the assessed value of the structure before the alteration occurred. For the purposes of this appendix, standard building maintenance, residing or reroofing are not considered as alterations.

SUBSTANTIAL DAMAGE. Any damage of any origin to a structure whereby the cost of restoring the structure to its original condition would be equal to or exceed 40 percent of the assessed value of the structure before the alteration occurred.

T-RATING. The time period that the penetration firestop system, including the penetrating item, limits the maximum temperature rise to 325°F (163°C) above its initial temperature through the penetration on the nonfire side when tested in accordance with ASTM E 814.

THROUGH PENETRATION. An opening that passes through an entire assembly.

THROUGH-PENETRATION FIRESTOP SYSTEM. An assemblage of specific materials or products that are designed, tested and fire-resistance rated to resist for a prescribed period of time the spread of fire through penetrations. The F- and T-rating criteria for penetration firestop systems shall be in accordance with ASTM E 814. See definitions of "F-rating" and "T-rating." When materials, systems or devices that have not been tested as part of a fire-resistance-rated assembly are incorporated into the assembly, sufficient data shall be made available to the building official to show that the required fire-resistance rating is not reduced. Materials and methods of construction used to protect joints and penetrations in fire-resistance-rated building elements shall not reduce the required fire-resistance rating.

VENEER. See Section 1402.1.

VENTILATION. The natural or mechanical process of supplying conditioned or unconditioned air to, or removing such air from, any space.

YARD. An open space, other than a court, unobstructed from the ground to the sky, except where specifically provided by this code, on the lot on which a building is situated.

SECTION AN103
BUILDING PLANNING

AN103.1 Design criteria. Buildings and structures, and all parts thereof, regulated by this appendix shall meet the design requirements of Section R301.

AN103.2 Building height, number of stories, allowable area and maximum number of dwelling units. The provisions of this section control the building height, number of stories, allowable area, and the maximum number of dwelling units for structures hereafter erected and additions to existing structures constructed under the provisions of this appendix. Additions and or alterations to existing buildings constructed prior to the

adoption of this code shall be in compliance with the provisions of the *Oregon Structural Specialty Code*.

AN103.2.1 Building height and number of stories. Low-rise residential multiple-family dwellings shall be limited to a maximum of 40 feet (12 192 mm) in height and three stories.

AN103.2.1.1 Height modifications. No height modifications shall be allowed. Structures greater than three stories above grade in height must be designed and constructed in accordance with the provisions of the *Oregon Structural Specialty Code*.

AN103.2.2 Sprinklered buildings. Low-rise residential multiple-family dwellings shall be limited to a maximum of three stories above grade, 36,000 square feet (3344 m^2) in cumulative area inclusive of attached carports and garages and 24 dwelling units when the building is provided with a fire sprinkler system installed in accordance with Section AN109.

AN103.2.3 Nonsprinklered buildings. Low-rise residential multiple-family dwellings shall be limited to a maximum of two stories, 24,000 square feet (2230 m^2) in cumulative area inclusive of attached carports and garages and 16 dwelling units when the building is not provided with a fire sprinkler system installed in accordance with Section AN109. Basements shall be considered a story for the purposes of determining the allowable number of stories of nonsprinklered buildings.

AN103.2.4 Mezzanines. A mezzanine or mezzanines in compliance with this section shall be considered a portion of the floor below. Such mezzanines shall not contribute to either the building area or number of stories as regulated by this section. The area of the mezzanine shall be included in determining the fire area defined in Section AN102. The clear height above and below the mezzanine floor construction shall not be less than 7 feet .(2137 mm)

AN103.2.4.1 Area limitation. The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the area of that room or space in which they are located. The enclosed portions of rooms shall not be included in a determination of the size of the room in which the mezzanine is located. In determining the allowable mezzanine area, the area of the mezzanine shall not be included in the area of the room.

AN103.2.5 Modifications to number of dwelling units and area. No area modifications shall be allowed under this chapter. Sprinkled structures with more dwelling units or an area greater than allowed by Section AN103.2.2 shall be designed and constructed in accordance with the provisions of the *Oregon Structural Specialty Code*. Nonsprinklered structures with more dwelling units, number of stories or an area greater than allowed by Section AN103.2.3 shall be designed and constructed in accordance with Section AN103.2.2 or shall be designed and constructed in accordance with the provisions of the *Oregon Structural Specialty Code*.

AN103.3 Building construction and fire-resistance-rated separation requirements. Building construction and fire-resistance-rated separation requirements for low-rise residential dwellings shall be regulated by this section.

AN103.3.1. Sprinklered buildings. Dwelling units shall be separated by fire partitions and horizontal assemblies constructed in accordance Section AN104.

AN103.3.2 Nonsprinklered buildings. Nonsprinklered buildings shall be provided with a minimum of one fire wall of not less than 2-hour fire-resistive construction. There shall not be more than eight dwelling units on each side of the wall with the maximum 12,000 square feet (1115 m^2) of floor area inclusive of attached carport and garage area per side of the fire wall. Fire walls shall be constructed in accordance with Section AN104.

Dwelling units shall be separated by fire partitions and horizontal assemblies constructed in accordance Section AN104.

Exterior walls shall be protected on the interior side with a minimum of $^5/_8$ inch (16 mm) Type X gypsum board installed as required for 1-hour fire-resistive construction.

AN103.3.3 Attached private residential parking garages and attached carports. Low-rise residential multiple-family dwellings may contain private residential parking garages and have attached carports. The area of a single garage or carport or the cumulative area of multiple garages and/or carports on any or all levels is limited to a maximum of 3,000 square feet (279 m^2) in area. Private residential parking garages and carports shall be separated according to the following:

1. Fire barriers constructed in accordance with Section AN104 shall separate private residential parking garages, dwelling units and incidental use areas. Fire barrier membrane and through penetrations shall be in accordance with Sections R317.3 and AN101.4.1.
2. Openings in fire barriers separating private residential parking garages, dwelling units and incidental use areas shall be protected as required in AN104.
3. Openings from a private residential parking garage directly into a room used for sleeping purposes shall not be permitted.
4. Parking garages used for multiple-unit parking shall be provided with outdoor ventilation air at a rate of 1.5 cfm/ft^2. The ventilation systems shall be provided with manual or automatic controls that will operate such systems whenever the space is occupied. Such ventilation systems shall be installed in accordance with the *Oregon Mechanical Specialty Code*.

AN103.3.4 Incidental uses. A low-rise residential multiple-family dwelling may contain communal laundry rooms, storage rooms and similar incidental use rooms when those uses are separated from the dwelling units as required by Table AN103.2.1.

TABLE AN103.2.1
INCIDENTAL USE AREAS

ROOM OR AREA[a]	SEPARATION[b]
Laundry rooms over 100 square feet	1 hour or provide automatic fire-extinguishing system
Storage rooms over 100 square feet (aggregate area)	1 hour or provide automatic fire-extinguishing system
Waste and linen collection rooms	1 hour or provide automatic fire-extinguishing system

a. Incidental use areas shall be separated from each other by a fire barrier of not less than 1-hour fire-resistive construction unless an automatic fire-extinguishing system is provided.
b. Where an automatic fire-extinguishing system is provided, it need only be provided in the incidental use room or area.

AN103.3.4.1 Communal laundry room ventilation. When multiple-family dwelling units share a communal laundry room, which houses more than one washing machine or more than one dryer, natural ventilation shall be provided through windows, louvers or other openings to the outdoors equal to 4 percent of the floor area being ventilated. The operating mechanisms for such openings shall be provided with ready access so the openings are readily controllable by the building occupants.

Exception: A mechanical ventilation system, designed in accordance with the *Oregon Mechanical Specialty Code*.

AN103.3.5 Shafts. The provisions of this section shall apply to vertical shafts where such shafts are required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies.

AN103.3.5.1 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this section.

Exceptions:

1. A shaft enclosure is not required for openings totally within an individual residential dwelling unit.
2. A shaft enclosure is not required for penetrations by pipe, tube, conduit, wire, cable, and vents protected in accordance with Section AN104.
3. A shaft enclosure is not required for penetrations by ducts protected in accordance with Section AN104.
4. A shaft enclosure is not required for approved masonry chimneys, where annular space protection is provided at each floor level in accordance with Section AN104.
5. A shaft enclosure is not required for a floor opening that complies with the following:
   5.1. Does not connect more than two stories.
   5.2. Is not concealed within the building construction.
   5.3. Is separated from floor openings serving other floors by construction conforming to required shaft enclosures.
6. A shaft enclosure is not required for joints protected by a fire-resistant joint system in accordance with Section AN104.

AN103.3.5.2 Shaft construction. The shaft enclosure shall be of materials permitted by the building type of construction.

AN103.3.5.3 Fire-resistance rating. The number of stories connected by the shaft enclosure shall include any basements but not any mezzanines. Shaft enclosures shall be constructed as fire barriers in accordance with Section AN104. Shaft enclosures shall have a fire-resistance rating not less than the floor assembly penetrated.

AN103.3.5.4 Continuity. Shaft enclosure walls shall extend from the top of the floor/ceiling assembly below to the underside of the floor or roof slab or deck above and shall be securely attached thereto. These walls shall be continuous through concealed spaces such as the space above a suspended ceiling. The supporting construction shall be protected to afford the required fire-resistance rating of the element supported. Hollow vertical spaces within the shaft enclosure construction wall shall be firestopped at every floor level.

AN103.3.5.5 Exterior walls. Where exterior walls serve as a part of a required shaft enclosure, such walls shall comply with the requirements of Section AN104 for exterior walls and the fire-resistance-rated enclosure requirements shall not apply.

AN103.3.5.6 Openings. Openings in a shaft enclosure shall be protected in accordance with Section AN104 as required for fire barriers. Such openings shall be self-closing or automatic-closing by smoke detection.

AN103.3.5.6.1 Prohibited openings. Openings other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.

AN103.3.5.7 Penetrations. Penetrations in a shaft enclosure shall be protected in accordance with Section AN104 as required for fire barriers.

AN103.3.5.7.1 Prohibited penetrations. Penetrations other than those necessary for the purpose of the shaft shall not be permitted in shaft enclosures.

AN103.3.5.8 Joints. Joints in a shaft enclosure shall comply with Section AN104.

AN103.3.5.9 Ducts and air transfer openings. Penetrations of a shaft enclosure by ducts and air transfer openings shall comply with Section AN104.

AN103.3.5.10 Enclosure at the bottom. Shafts that do not extend to the bottom of the building or structure shall:

1. Be enclosed at the lowest level with construction of the same fire-resistance rating as the lowest floor through which the shaft passes, but not less than the rating required for the shaft enclosure;
2. Terminate in a room having a use related to the purpose of the shaft. The room shall be separated from the remainder of the building by construction having a fire-resistance rating and opening protectives

at least equal to the protection required for the shaft enclosure; or

3. Be protected by approved fire dampers installed in accordance with their listing at the lowest floor level within the shaft enclosure.

Exceptions:

1. The fire-resistance-rated room separation is not required provided there are no openings in or penetrations of the shaft enclosure to the interior of the building except at the bottom. The bottom of the shaft shall be closed off around the penetrating items with materials permitted by Section AN104 for draftstopping, or the room shall be provided with an approved automatic fire suppression system.
2. The fire-resistance-rated room separation and the protection at the bottom of the shaft are not required provided there are no combustibles in the shaft and there are no openings or other penetrations through the shaft enclosure to the interior of the building.

AN103.3.5.11 Enclosure at the top. A shaft enclosure that does not extend to the underside of the roof deck of the building shall be enclosed at the top with construction of the same fire-resistance rating as the topmost floor penetrated by the shaft, but not less than the fire-resistance rating required for the shaft enclosure.

AN103.4 Location on lot. The provisions of this section control the location on lot of the structures hereafter erected and additions to existing structures.

AN103.4.1 Premises identification. See Section R321.1.

AN103.4.2 Access. Buildings shall adjoin or have access to a yard, street, alley, or public way on not less than one side. The centerline of an adjoining public way shall be considered an adjacent property line.

AN103.4.3 Fire-resistive construction due to location on property. Exterior wall shall be fire-resistance rated and have opening protection as required by this section.

AN103.4.3.1 Fire resistance of walls. Exterior walls located less than 5 feet (1524 mm) from a property line shall be constructed as fire walls in accordance with Section AN104 and be of not less than 1-hour fire-resistive rating when tested in accordance with ASTM 119. Distances shall be measured at right angles from the property line. These provisions shall not apply to walls at right angles to the property line.

Exception: Exterior walls of detached accessory private residential parking garages and carports located 3 feet (914 mm) or more from a property line may be of nonfire-rated construction.

AN103.4.3.2 Allowable openings. Openings in exterior walls are not permitted less than five feet (1524 mm) from a property line.

Exception: Exterior walls of detached accessory private residential parking garages and carports located 3 feet or more from a property line may have unprotected openings.

AN103.4.3.3 Projections. Cornices, eave overhangs, exterior balconies and similar architectural appendages extending beyond the floor area shall conform to the requirements of this section. Exterior egress balconies and exterior exit stairways shall also comply with Section AN110.11. Projections beyond the exterior wall shall not extend more than 12 inches (305 mm) into areas where openings are prohibited be of not less than 1-hour fire-resistive construction. Projections extending into areas where openings are prohibited shall have sufficient structural stability such that it will remain in place for the duration of time indicated.

AN103.4.3.4 Parapets. Parapets shall be provided on exterior walls of buildings.

Exceptions: A parapet need not be provided on an exterior wall where any of the following conditions exist:

1. The wall is not required to be fire-resistance-rated construction.
2. The building has an area of not more than 1,000 square feet (93 m^2) on any floor.
3. One-hour fire-resistance-rated exterior walls that terminate at the underside of the roof sheathing, deck or slab, provided:
   - 3.1. Where the roof/ceiling framing elements are parallel to the walls, such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction for a width of 4 feet (1220 mm) measured from the interior side of the wall.
   - 3.2. Where roof/ceiling framing elements are not parallel to the wall, the entire span of such framing and elements supporting such framing shall not be of less than 1-hour fire-resistance-rated construction.
   - 3.3. Openings in the roof shall not be located within 5 feet (1524 mm) of the 1-hour fire-resistance-rated exterior wall.
   - 3.4. The entire building shall be provided with not less than a Class B roof covering.
4. When a structure is provided with a Class C roof covering, the exterior wall shall be permitted to terminate at the roof sheathing or deck in provided:
   - 4.1. The roof sheathing or deck is constructed of approved noncombustible materials or of fire-retardant-treated wood, for a distance of 4 feet (1220 mm); or
   - 4.2. The roof is protected with 0.625-inch (15.88 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of nominal 2-inch (51 mm) led-

gers attached to the sides of the roof framing members, for a minimum distance of 4 feet (1220 mm).

AN103.4.3.5 Parapet construction. See Section R317.2.3

AN103.4.3.6 Membrane and through penetrations. Fire barrier membrane and through penetrations shall be in accordance with Sections R317.3, AN101.4.1 and AN104.

AN103.4.4 Buildings on the same lot. For the purposes of determining the required exterior wall fire rating, allowable opening and roof-covering requirements, buildings on the same lot shall be assumed to have an imaginary property line between them. Where a new building is to be erected on the same lot as an existing building, the location of the assumed imaginary property line with relation to the existing building shall be such that the exterior wall and opening protection of the existing building meet the criteria as set forth in Section AN103.4.

Two or more buildings on the same lot shall either be regulated as separate buildings or shall be considered as portions of one building if the buildings combined number of dwelling units and combined area do not exceed that allowed in Section AN103.2 for a single building.

AN103.5 Smoke alarms. Smoke alarms shall be installed in dwelling units of buildings regulated by this appendix in accordance with Section R313.

SECTION AN104
FIRE-RESISTANCE-RATED CONSTRUCTION

AN104.1 General. Wall and floor ceiling assemblies required be of fire-resistance-rated construction shall be constructed according to this section and Table AN104.1.

TABLE AN104.1
FIRE-RESISTIVE RATINGS[a]

ASSEMBLY TYPE		NONSPRINKLED BUILDINGS	SPRINKLED BUILDINGS
Firewalls[b]		2-hour	NR[c]
Fire Barriers[b]	Vertical	1-hour	1/2-hour
	Horizontal	1-hour	1/2-hour
Fire Partitions		1-hour	1/2-hour
Shafts		1-hour	1-hour
Exterior Walls		1-hour[d]	NR[c]
Exterior Walls < 5 feet from a property line		1-hour[a]	1-hour[a]

a. When tested in accordancie with ASTM E 119.
b. For additional requirements, see Section AN104.4 and AN104.5.
c. Not required.
d. Exterior walls shall be protected on the interior side with a minimum of 5/8-inch Type X gypsum board installed as required for 1-hour fire-resistive construction.

AN 104.2 Vertical dwelling unit separation. Walls separating dwelling units in the same building shall be constructed as fire partitions and comply with this section. The fire-resistance rating of the walls shall be of not less than 1 hour.

Exceptions: Dwelling unit separations may have fire-resistance ratings of not less than 1/2 hour in buildings equipped throughout with an NFPA 13 or 13R sprinkler system installed in accordance with OSSC.

AN104.2.1 Continuity. Fire partitions shall extend from the top of the floor assembly below to the underside of the floor/ceiling assembly above and from the top of the floor assembly below to the underside of the roof sheathing above for the uppermost story and shall be securely attached thereto.

AN104.2.2 Openings. Openings in a fire partition shall be protected in accordance with Section AN104.8.

AN104.2.3 Penetrations. Penetrations through fire partitions shall comply with Section R317.3.

AN104.2.4 Ducts and air transfer openings. Penetrations by ducts and air transfer openings shall comply with Sections AN104.6.

AN104.3 Horizontal dwelling unit separation. Floor-ceiling assemblies separating individual dwelling units shall comply with this section.

AN104.3.1 Fire-resistance rating of floor/ceiling assemblies. Floor-ceiling assemblies separating dwelling units in the same building shall be constructed as fire barriers. The fire-resistance rating of the assembly shall be per Table AN104.1.

Exceptions: Dwelling unit separations may have fire-resistance ratings of not less than 1/2 hour in buildings equipped throughout with an NFPA 13 or 13R automatic sprinkler system installed in accordance with OSSC.

AN104.3.2 Access doors. Access doors shall be permitted in ceilings of fire-resistance-rated floor/ceiling and roof/ceiling assemblies provided such doors are tested in accordance with ASTM E 119 as horizontal assemblies and labeled by an approved agency for such purpose.

AN104.3.3 Unusable space. In 1-hour fire-resistance-rated floor construction, the ceiling membrane is not required to be installed over unusable crawl spaces.

AN104.3.4 Continuity. Assemblies shall be continuous without openings, penetrations or joints except as permitted by this section and Section AN103.3.5. The supporting construction shall be protected to afford the required fire-resistance rating of the horizontal assembly supported.

AN104.3.5 Penetrations. Penetrations through fire-resistance-rated horizontal assemblies shall comply with Section R317.3.

AN104.3.6 Ducts and air transfer openings. Penetrations by ducts and air transfer openings shall comply with Section AN104.6.

AN104.3.7 Other penetrations. Gas vents, factory-built chimneys and other penetrations that are prohibited from being provided with fire or smoke dampers, shall be provided with shafts in accordance with Section AN103.3.5.

AN104.4 Fire barriers for occupancy separation. Incidental uses, garages and carports shall be separated from dwelling units with fire barriers in accordance with Section AN103.3.3

and Table AN103.2.1. The fire-resistance rating of the assembly shall be as required by Table AN104.1.

AN104.4.1 Continuity of fire barrier walls. Fire barrier walls shall extend from the top of the floor/ceiling assembly below to the underside of the floor or deck above and from the top of the floor assembly below to the underside of the roof sheathing above for the uppermost story and shall be securely attached thereto. These walls shall be continuous through concealed spaces such as the space above a suspended ceiling. The supporting construction for fire barrier walls shall be protected to afford the required fire-resistance rating of the fire barrier supported except for 1-hour fire-resistance-rated incidental use area separations as required by Table AN103.2.1. Hollow vertical spaces within the fire barrier wall shall be fire-stopped at every floor level.

Exceptions: Shaft enclosure shall be permitted to terminate at a top enclosure complying with Section AN103.3.5.11.

AN104.4.2 Openings. Openings in a fire barrier wall shall be protected in accordance with Section AN104.8. Openings shall be limited to a maximum aggregate width of 25 percent of the length of the wall, and the maximum area of any single opening shall not exceed 120 square feet (11 m^2).

AN104.4.3 Horizontal fire barriers. Horizontal fire barriers separating incidental uses, garages and carports shall comply with Section AN104.3.

AN104.5 Fire walls. Fire walls used to divide nonsprinklered buildings into two separate areas shall comply with this section. The extent and location of such fire walls shall provide a complete separation. Where a fire wall also separates groups that are required to be separated by a fire barrier wall, the most restrictive requirements of each separation shall apply. Such fire walls shall be constructed without openings.

AN104.5.1 Fire-resistance rating. Fire walls shall have a fire-resistance rating of not less than 2 hours.

AN104.5.2 Horizontal projecting elements. Fire walls shall extend to the outer edge of horizontal projecting elements such as balconies, roof overhangs, canopies and architectural projections that are within 4 feet (1220 mm) of the fire wall.

Exceptions:

1. Horizontal projecting elements without concealed spaces provided the exterior wall behind and below the projecting element has not less than 1-hour fire-resistance-rated construction for a distance not less than the depth of the projecting element on both sides of the fire wall. Openings within such exterior walls shall be protected by fire assemblies having a fire protection rating of not less than $^3/_4$ hour.
2. Horizontal projecting elements with concealed spaces, the fire wall need only extend through the concealed space to the outer edges of the projecting elements. The exterior wall behind and below the projecting element shall be of not less than 1-hour fire-resistance-rated construction for a distance not less than the depth of the projecting elements on both sides of the fire wall. Openings within such exterior walls shall be protected by fire assemblies having a fire-protection rating of not less than $^3/_4$ hour.

AN104.5.3 Vertical continuity. Fire walls shall extend from the foundation to a termination point at least 30 inches (762 mm) above both adjacent roofs.

Exceptions:

1. Stepped buildings in accordance with Section AN104.5.5.
2. Fire walls shall be permitted to terminate at the underside of the roof sheathing, deck or slab provided:
   - 2.1. The lower roof assembly within 4 feet (1220 mm) of the wall has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
   - 2.2. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
   - 2.3. Each building shall be provided with not less than a Class B roof covering.
3. Walls shall be permitted to terminate at the underside of noncombustible roof sheathing, deck, or slabs where both buildings are provided with not less than a Class B roof covering. Openings in the roof shall not be located within 4 feet (1220 mm) of the fire wall.
4. Walls shall be permitted to terminate at the underside of combustible roof sheathing or decks provided:
   - 4.1. There are no openings in the roof within 4 feet (1220 mm) of the fire wall,
   - 4.2. The roof is covered with a minimum Class B roof covering, and
   - 4.3. The roof sheathing or deck is constructed of fire-retardant-treated wood for a distance of 4 feet (1220 mm) on both sides of the wall or the roof is protected with $^5/_8$ inch (15.9 mm) Type X gypsum board directly beneath the underside of the roof sheathing or deck, supported by a minimum of 2-inch (51 mm) ledgers attached to the sides of the roof framing members for a minimum distance of 4 feet (1220 mm) on both sides of the fire wall.

AN104.5.4 Stepped buildings. Where a fire wall serves as an exterior wall for a building and separates buildings having different roof levels, such wall shall terminate at a point not less than 30 inches (762 mm) above the lower roof level, provided the exterior wall for a height of 15 feet (4572 mm) above the lower roof is not less than 1-hour fire-resistance- rated construction from both sides with

openings protected by assemblies having a $^3/_4$-hour fire protection rating.

Exception: Where the fire wall terminates at the underside of the roof sheathing, deck or slab of the lower roof, provided:

1. The lower roof assembly within 10 feet (3048 mm) of the wall has not less than a 1-hour fire-resistance rating and the entire length and span of supporting elements for the rated roof assembly has a fire-resistance rating of not less than 1 hour.
2. Openings in the lower roof shall not be located within 10 feet (3048 mm) of the fire wall.

AN104.5.5 Combustible framing in fire walls. Where combustible members frame into hollow walls or walls of hollow units, hollow spaces shall be solidly filled for the full thickness of the wall and for a distance not less than 4 inches (102 mm) above, below and between the structural members, with noncombustible materials approved for fireblocking.

AN104.5.6 Penetrations. Penetrations through firewalls shall comply with Section R317.3.

AN104.5.7 Ducts and air transfer openings. Ducts and air transfer openings shall not penetrate fire walls.

AN104.6 Duct and transfer openings in fire-resistance rated assemblies. The provisions of this section shall govern the protection of ducts and air transfer openings in fire-resistance-rated assemblies.

AN104.6.1 Ducts and air transfer openings without dampers. Ducts and air transfer openings that penetrate fire-resistance-rated assemblies and are not required by this section to have dampers shall comply with the requirements of Section R317.3 for membrane and through penetration fire-stops.

Where penetration of a fire-resistive assembly is beyond the scope of Section R317.3, the provisions of this section and Section 607 in the *Oregon Mechanical Specialty Code* shall govern the protection of duct penetrations and aire transfer openings in fire-resistance-rated assemblies.

AN104.6.2 Installation. Fire dampers, smoke dampers, combination fire/smoke dampers and ceiling dampers located within air distribution and smoke control systems shall be installed in accordance with the requirements of this section, the manufacturer's installation instructions and listing.

AN104.6.3 Damper testing and ratings. Dampers shall be listed and bear the label of an approved testing agency indicating compliance with the standards in this section. Fire dampers shall comply with the requirements of UL 555. Only fire dampers labeled for use in dynamic systems shall be installed in heating, ventilation and air-conditioning systems designed to operate with fans on during a fire. Smoke dampers shall comply with the requirements of UL 555S. Combination fire/smoke dampers shall comply with the requirements of both UL 555 and UL 555S. Ceiling radiation dampers shall comply with the requirements of UL 555C.

AN104.6.4 Fire protection rating. Fire dampers shall have the minimum fire protection rating of not less the 1.5 hours.

AN104.6.4.1 Fire damper actuating device. The fire damper actuating device shall have an operating temperature which shall be approximately 50°F (10°C) above the normal temperature within the duct system, but not less than 160°F (71°C).

AN104.6.5 Smoke damper ratings. Smoke damper leakage ratings shall not be less than Class II. Elevated temperature ratings shall not be less than 250°F (121°C).

AN104.6.5.1 Smoke damper actuation methods. The smoke damper shall close upon actuation of a listed smoke detector or detectors installed in accordance with *Oregon Structural Specialty Code*, Section 907.10 and one of the following methods, as applicable:

1. Where a damper is installed within a duct, a smoke detector shall be installed in the duct within 5 feet (1524 mm) of the damper with no air outlets or inlets between the detector and the damper. The detector shall be listed for the air velocity, temperature and humidity anticipated at the point where it is installed. Other than in mechanical smoke control systems, dampers shall be closed upon fan shutdown where local smoke detectors require a minimum velocity to operate.
2. Where a damper is installed above smoke barrier doors in a smoke barrier, a spot-type detector listed for releasing service shall be installed on either side of the smoke barrier door opening.
3. Where a damper is installed within an unducted opening in a wall, a spot-type detector listed for releasing service shall be installed within 5 feet (1524 mm) horizontally of the damper.
4. Where a total-coverage smoke detector system is provided within areas served by a heating, ventilation and air-conditioning (HVAC) system, dampers shall be permitted to be controlled by the smoke detection system.

AN104.6.6 Access and identification. Fire and smoke dampers shall be provided with an approved means of access, large enough to permit inspection and maintenance of the damper and its operating parts. The access shall not affect the integrity of fire-resistance-rated assemblies. The access openings shall not reduce the fire-resistance rating of the assembly. Access points shall be permanently identified on the exterior by a label having letters not less than 0.5 inch (12.7 mm) in height reading: SMOKE DAMPER or FIRE DAMPER. Access doors in ducts shall be tight fitting and suitable for the required duct construction.

AN104.6.7 Where required. Fire dampers, smoke dampers, combination fire/smoke dampers and ceiling radiation dampers shall be provided at the locations prescribed in this section. Where an assembly is required to have both fire dampers and smoke dampers, combination fire/smoke dampers or a fire damper and a smoke damper shall be required.

AN104.6.7.1 Fire barriers. Duct and air transfer openings of fire barriers shall be protected with approved fire dampers installed in accordance with their listing.

Exception: Fire dampers are not required at penetrations of fire barriers where any of the following apply:

1. Penetrations are tested in accordance with ASTM E 119 as part of the fire-resistance-rated assembly.
2. Such walls are penetrated by ducted HVAC systems, have a required fire-resistance rating of 1 hour or less, are in buildings equipped throughout with an automatic sprinkler system in accordance with Section AN109. For the purposes of this exception, a ducted HVAC system shall be a duct system for conveying supply, return or exhaust air as part of the structure's HVAC system. Such a duct system shall be constructed of sheet steel not less than 26 gage thickness and shall be continuous from the air-handling appliance or equipment to the air outlet and inlet terminals.

AN104.6.7.2 Penetrations of shaft enclosures. Shaft enclosures that are permitted to be penetrated by ducts and air transfer openings shall be protected with approved fire and smoke dampers installed in accordance with their listing.

Exception: Fire dampers are not required at penetrations of shafts where:

1. Steel exhaust subducts extended at least 22 inches (559 mm) vertically in exhaust shafts provided there is a continuous airflow upward to the outside; or
2. Penetrations are tested in accordance with ASTM E 119 as part of the rated assembly; or
3. The penetrations are in parking garage exhaust or supply shafts that are separated from other building shafts by not less than 2-hour fire-resistance-rated construction.

AN104.6.7.3 Fire partitions. Duct penetrations in fire partitions shall be protected with approved fire dampers installed in accordance with their listing.

Exceptions: Fire dampers are not required where any of the following apply:

The duct system is constructed of approved materials in accordance with the *Oregon Mechanical Specialty Code* and the duct penetrating the wall meets all of the following minimum requirements:

1. The duct shall not exceed 100 square inches (0.06 m^2).
2. The duct shall be constructed of steel a minimum of 0.0217 inch (0.55 mm) in thickness.
3. The duct shall not have openings that communicate the corridor with adjacent spaces or rooms.
4. The duct shall be installed above a ceiling.
5. The duct shall not terminate at a wall register in the fire-resistance-rated wall.
6. A minimum 12-inch-long (0.30 m) by 0.060-inch-thick (1.52 mm) steel sleeve shall be centered in each duct opening. The sleeve shall be secured to both sides of the wall and all four sides of the sleeve with minimum $1^1/_2$-inch by $1^1/_2$-inch by 0.060-inch (0.038 m by 0.038 m by 1.52 mm) steel retaining angles. The retaining angles shall be secured to the sleeve and the wall with No. 10 (M5) screws. The annular space between the steel sleeve and wall opening shall be filled with rock (mineral) wool batting on all sides.

AN104.6.7.4 Horizontal assemblies. Penetrations by ducts and air transfer openings of a floor, floor/ceiling assembly or the ceiling membrane of a roof/ceiling assembly shall be protected by a shaft enclosure that complies with Section AN103.3.5 or shall comply with this section.

AN104.6.7.4.1 Through penetrations. A duct and air transfer opening system constructed of approved materials in accordance with the *Oregon Mechanical Specialty Code* that penetrates a fire-resistance- rated floor/ceiling assembly that connects not more than two stories is permitted without shaft enclosure protection provided a fire damper is installed at the floor line.

Exception: A duct is permitted to penetrate three floors or less without a fire damper at each floor provided it meets all of the following requirements.

1. The duct shall be contained and located within the cavity of a wall and shall be constructed of steel not less than 0.019 inch (0.48 mm) (26 gage) in thickness.
2. The duct shall open into only one dwelling unit or sleeping unit and the duct system shall be continuous from the unit to the exterior of the building.
3. The duct shall not exceed 4-inch (102 mm) nominal diameter and the total area of such ducts shall not exceed 100 square inches (0.065 m^2) any 100 square feet (9.3 m^2) of floor area.
4. The annular space around the duct is protected with materials that prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E 119 time-temperature conditions under a minimum positive pressure differential of 0.01 inch (2.49 Pa) of water at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated
5. Grille openings located in a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly shall be protected with a ceiling radiation damper in accordance with Section AN105.9.12.

AN104.6.7.4.2 Membrane penetrations. Where duct systems constructed of approved materials in accordance with the *Oregon Mechanical Specialty Code* penetrate a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly, shaft enclosure protection is not required provided an approved ceiling radiation damper is installed at the ceiling line. Where a duct is not attached to a diffuser that penetrates a ceiling of a fire-resistance-rated floor/ceiling or roof/ceiling assembly, shaft enclosure protection is not required provided an approved ceiling radiation damper is installed at the ceiling line. Ceiling radiation dampers shall be tested in accordance with UL 555C and constructed in accordance with the details listed in a fire-resistance-rated assembly or shall be labeled to function as a heat barrier for air-handling outlet/inlet penetrations in the ceiling of a fire-resistance-rated assembly. Ceiling radiation dampers shall not be required where ASTM E 119 fire tests have shown that ceiling radiation dampers are not necessary in order to maintain the fire-resistance rating of the assembly. Ceiling radiation dampers shall not be required where exhaust duct penetrations are protected in accordance with Section R321.3.2 and the exhaust ducts are located within the cavity of a wall, and do not pass through another dwelling unit or tenant space.

AN 104.6.7.4.3 Nonfire-resistance-rated assemblies. Duct systems constructed of approved materials in accordance with the *Oregon Mechanical Specialty Code* that penetrate nonfire-resistance-rated floor assemblies and that connect not more than two stories are permitted without shaft enclosure protection provided that the annular space between the assembly and the penetrating duct is filled with an approved noncombustible material to resist the free passage of flame and the products of combustion. Duct systems constructed of approved materials in accordance with the *Oregon Mechanical Specialty Code* that penetrate nonfire-resistance-rated floor assemblies and that connect not more than three stories are permitted without shaft enclosure protection provided that the annular space between the assembly and the penetrating duct is filled with an approved noncombustible material to resist the free passage of flame and the products of combustion, and a fire damper is installed at each floor line.

Exception: Fire dampers are not required in ducts within individual residential dwelling units.

AN104.6.8 Flexible ducts and air connectors. Flexible ducts and air connectors shall not pass through any fire-resistance-rated assembly. Flexible air connectors shall not pass through any wall, floor or ceiling.

AN104.7 Fire-blocking and draft-stopping. Fire-blocking and draft-stopping for concealed spaces other than attics, shall be installed in combustible concealed locations in accordance with Sections R502.12, R502.13 and R602.8. Materials used for fire-blocking and draft-stopping shall be as described in Sections R502.12.1 and R602.8.1.

AN104.7.1 Double stud walls. Batts or blankets of mineral or glass fiber or other approved nonrigid materials shall be allowed as fire-blocking in walls constructed using parallel rows of studs or staggered studs.

AN104.7.2 Architectural trim. Fire-blocking shall be installed within concealed spaces of exterior wall finish and other exterior architectural elements where permitted to be of combustible construction or where erected with combustible frames, at maximum intervals of 20 feet (6096 mm). If noncontinuous, such elements shall have closed ends, with at least 4 inches (102 mm) of separation between sections.

Exceptions: Fire-blocking shall not be required where installed on noncombustible framing and the face of the exterior wall finish exposed to the concealed space is covered by one of the following materials:

1. Aluminum having a minimum thickness of 0.019 inch (0.5 mm).
2. Corrosion-resistant steel having a base metal thickness not less than 0.016 inch (0.4 mm) at any point.
3. Other approved noncombustible materials.

AN104.8 Opening protectives. Opening protectives required by other sections of this code shall comply with the provisions of this section.

AN104.8.1 Fire-resistance-rated glazing. Labeled fire-resistance-rated glazing tested as part of a fire-resistance-rated wall assembly in accordance with ASTM E 119 shall not be required to comply with this section.

AN104.8.2 Fire door and shutter assemblies. Approved fire door and fire shutter assemblies shall be constructed of any material or assembly of component materials that conforms to the test requirements of Section AN104.8.2.1 or AN104.8.2.2 and shall have a fire protection rating of ¾ hours. Fire door assemblies and shutters shall be installed in accordance with the provisions of this section and NFPA 80.

Exceptions:

1. Labeled protective assemblies that conform to the requirements of this section or UL 10A, UL 14B and UL 14C for tin-clad fire door assemblies.
2. Floor fire doors shall comply with Section AN104.4.2.

AN104.8.2.1 Side-hinged or pivoted swinging doors. Side-hinged and pivoted swinging doors shall be tested in accordance with NFPA 252 or UL 10C.

AN104.8.3 Labeled protective assemblies. Fire door assemblies shall be labeled by an approved agency. The labels shall comply with NFPA 80, and shall be permanently affixed to the door or frame.

AN104.8.4 Fire doors. Fire doors and frames shall be labeled showing the name of the manufacturer, the name of the third-party inspection agency and the fire protection rating. Smoke and draft control doors complying with UL 1784 shall be labeled as such. Labels shall be approved and permanently affixed. The label shall be applied at the factory or location where fabrication and assembly are performed.

AN104.9 Door closing. Fire doors shall be self-closing or automatic-closing in accordance with this section.

AN104.9.1 Latch required. Unless otherwise specifically permitted, single fire doors and both leaves of pairs of side-hinged swinging fire doors shall be provided with an active latch bolt that will secure the door when it is closed.

AN104.9.2 Automatic-closing fire door assemblies. Automatic- closing fire door assemblies shall be self-closing in accordance with NFPA 80.

AN 104.9.3 Smoke-activated doors. Automatic-closing fire doors installed in fire partitions shall be automatic closing by the actuation of smoke detectors installed in accordance with *Oregon Structural Specialty Code*, Section 907.10 or by loss of power to the smoke detector or hold-open device. Fire doors that are automatic closing by smoke detection shall not have more than a 10-second delay before the door starts to close after the smoke detector is actuated.

AN104.10 Glazing material. Fire-protection-rated glazing, when required by Section AN104.5.3, AN104.5.5 or AN110.11.5 shall comply with the following

AN104.10.1 Labeling. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard and the fire protection rating. Such label or other identification shall be issued by an approved agency and shall be permanently affixed.

AN104.10.2 Safety glazing. Fire-protection-rated glazing installed in fire doors or fire window assemblies in areas subject to human impact in hazardous locations shall comply with the *Oregon Structural Specialty Code*.

AN104.10.3 Fire-protection-rated glazing. Glazing in fire window assemblies shall be fire-protection-rated in accordance with Table 104.10.3 and this section. Fire-protection-rated glazing installed as an opening protective in fire partitions and fire barriers shall be tested in accordance with and shall meet the acceptance criteria of NFPA 257 for a fire-protection rating of 45 minutes. Fire-protection-rated glazing shall also comply with NFPA 80. Fire-protection-rated glazing required in accordance with Section AN110.11.5 for exterior wall opening protection shall be tested in accordance with and shall meet the acceptance criteria of NFPA 257 for a fire-protection rating of 45 minutes.

TABLE AN104.10.3
FIRE WINDOW ASSEMBLY FIRE PROTECTION RATING

TYPE OF ASSEMBLY	REQUIRED ASSEMBLY RATING (hours)	MINIMUM FIRE WINDOW ASSEMBLY RATING (hours)[b]
Interior walls:		
Fire walls	2	NP[a]
Fire barriers and fire partitions	1	$^3/_4$
Rated glazing required by Section AN110.11.5	0	$^3/_4$

a. Not permitted.

b. Fire-protection-rated glazing in 0.5-hour fire-resistance-rated partitions is permitted to have an 0.33-hour fire protection rating.

AN104.10.4 Wired glass. Steel window frame assemblies of 0.125-inch (3.2 mm) minimum solid section or of not less than nominal 0.048-inch-thick (1.2 mm) formed sheet steel members fabricated by pressing, mitering, riveting, interlocking or welding and having provision for glazing with $^1/_4$-inch (6.4 mm) wired glass where securely installed in the building construction and glazed with $^1/_4$-inch (6.4 mm) labeled wired glass shall be deemed to meet the requirements for a $^3/_4$-hour fire window assembly. Wired glass panels shall conform to the size limitations set forth in Table 715.4.3.

AN104.10.5 Nonwired glass. Glazing other than wired glass in fire window assemblies shall be fire-protection-rated glazing installed in accordance with and complying with the size limitations set forth in NFPA 80.

AN104.10.6 Installation. Fire-protection-rated glazing shall be in the fixed position or be automatic-closing and shall be installed in approved frames.

AN104.10.7 Window mullions. Metal mullions that exceed a nominal height of 12 feet (3658 mm) shall be protected with materials to afford the same fire-resistance rating as required for the wall construction in which the protective is located.

AN104.10.8 Size limitations. The total area of windows shall not exceed 25 percent of the area of a common wall with any room.

AN104.10.9 Labeling requirements. Fire-protection-rated glazing shall bear a label or other identification showing the name of the manufacturer, the test standard, and the fire protection rating. Such label or identification shall be issued by an approved agency and shall be permanently affixed.

SECTION AN105
INTERIOR FINISHES

AN105.1 Interior finishes. Interior finishes and materials shall comply with this section.

AN105.1.1 Wall and ceiling finishes. Wall and ceiling finishes in low-rise residential multiple-family dwellings shall comply with Sections R702 and R805.

AN105.1.2 Flame spread and smoke density. Wall and ceiling finishes shall have flame spread and smoke desity classifications in accordance with Section R315.

AN105.1.3 Plastics. Plastics used in buildings shall comply with Section R314.

AN105.1.4 Insulation. Insulation materials, including facings such as vapor barriers or breather papers installed within floor/ceiling assemblies, roof/ceiling assemblies, wall assemblies, crawl spaces and attics shall comply with Section R316.

AN105.2 Gypsum board. Gypsum board and plaster shall comply with Sections R701 and R702.

AN105.3 General. Glass and glazing shall comply with Section R308.

SECTION AN106
INTERIOR ENVIRONMENT

AN 106.1 Scope. The provisions of this chapter shall govern ventilation, temperature control, lighting, yards and courts, sound transmission, room dimensions, surrounding materials and rodentproofing associated with the interior spaces of buildings.

AN106.1.1 Ventilation. Buildings shall be provided with natural ventilation in accordance with Section R408 for under-floor spaces and Section R806 for attic spaces. Alternatively approved mechanical ventilation may be provided in accordance with the *Oregon Mechanical Specialty Code*.

AN106.1.2 Natural ventilation. Natural ventilation of an occupied space shall be through windows, doors, louvers or other openings to the outdoors in accordance with Section R303. The operating mechanism for such openings shall be provided with ready access so that the openings are readily controllable by the building occupants.

AN106.1.3 Openings below grade. Where openings below grade provide required natural ventilation, the outside horizontal clear space measured perpendicular to the opening shall be one and one-half times the depth of the opening. The depth of the opening shall be measured from the average adjoining ground level to the bottom of the opening.

AN106.1.4 Openings on yards or courts. Where natural ventilation is to be provided by openings onto yards or courts, such yards or courts shall comply with Section AN106.8.

AN106.2 Required heating. Every dwelling unit shall be provided with heating facilities in accordance with Section R303.6.

AN106.3 Sound transmission. Wall and floor/ceiling assemblies separating dwelling units shall be provided with sound transmission in accordance with Appendix K.

AN106.4 Energy efficiency. Buildings designed and constructed under this appendix shall meet the energy efficiency related requirements of Chapter 11 of this code.

AN106.5 Lighting. Every space intended for human occupancy shall be provided with natural light by means of exterior glazed openings in accordance with Section R303 or shall be provided with artificial light.

AN106.5.1 Exterior openings. Exterior openings required by Section AN106.7 for natural light shall open directly onto a public way, yard or court.

Exceptions:

1. Required exterior openings are permitted to open into a roofed porch where the porch:
   1.1. Abuts a public way, yard or court.
   1.2. Has a ceiling height of not less than 7 feet (2134 mm).
   1.3. Has a longer side at least 65 percent open and unobstructed.
2. Skylights are not required to open directly onto a public way, yard or court.

AN106.6.1 Artificial light. Artificial light shall be provided that is adequate to provide an average illumination of 10 foot-candles (107 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

AN106.6.2 Stairway illumination. Stairways within dwelling units and exterior stairways serving a dwelling unit shall have an illumination level on tread runs of not less than 1 foot-candle (11 lux).

AN106.6.3 Controls. The control for activation of the required stairway lighting shall be in accordance with the *Oregon Electrical Specialty Code*.

AN106.6.4 Emergency egress lighting. The means of egress shall be illuminated in accordance with Section AN110.8.

AN 106.7 Yards and courts. This section shall apply to yards and courts adjacent to exterior openings that provide natural light or ventilation. Such yards and courts shall be on the same property as the building.

AN106.7.1 Yards. Yards shall not be less than 5 feet (1524 mm) in width.

AN106.7.2 Courts. Courts shall not be less than 10 feet (3048 mm) in width.

AN106.7.3 Air intake. Courts more than two stories in height shall be provided with a horizontal air intake at the bottom not less than 10 square feet (0.93 m^2) in area and leading to the exterior of the building unless abutting a yard or public way.

AN106.7.4 Court drainage. The bottom of every court shall be properly graded and drained to a public sewer or other approved disposal system complying with the *Oregon Plumbing Specialty Code*.

AN106.8 Minimum room areas, ceiling heights and sanitation. Minimum room areas, ceiling heights and sanitation shall be in accordance with Sections R304, R305 and R306.

Exception: Habitable spaces shall have a ceiling height of not less than 7 feet 6 inches (2286 mm).

AN106.8.1 Efficiency dwelling units. An efficiency living unit shall conform to the requirements of the code except as modified herein:

1. The unit shall have a living room of not less than 220 square feet (20.4 m) of floor area. An additional 100 square feet (9.3 m^2) of floor area shall be provided for each occupant of such unit in excess of two.
2. The unit shall be provided with a separate closet.
3. The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a clear working space of not less than 30 inches (762 mm) in front. Light and ventilation conforming to this code shall be provided.
4. The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.

AN106.8.2 Crawl spaces and attics. Crawl spaces and attic spaces shall be provided with a minimum of one access opening each in accordance with Sections R408.3 and R807.1.

AN106.8.3 Mechanical appliances. Access to mechanical appliances installed in under-floor areas, in attic spaces and on roofs or elevated structures shall be in accordance with the Chapter 13 of this code.

SECTION AN107
FLOORS, FLOOR-CEILINGS, ROOF-CEILINGS AND ROOF COVERINGS

AN107.1 General. Floors, floor-ceilings, roof-ceilings and roof coverings shall comply with this section.

AN107.1.1 Floors and floor-ceilings. Floors and floor-ceilings, when not required to be designed in accordance with accepted engineering practice, may be constructed in accordance with Chapter 5 of this code.

AN107.1.2 Roof-ceilings. Roof-ceilings, when not required to be designed, in accordance with accepted engineering practice, may be constructed in accordance with Chapter 8 of this code.

AN107.1.3 Roof coverings. Roof coverings shall be in accordance with Chapter 9 of this code.

Exception:

1. Building closer than 10 feet (3048 mm) to a property line shall have a minimum Class B roof.
2. Buildings with a separation of less than 10 feet between them shall have a minimum Class B roof installed on each building.

SECTION AN108
(RESERVED)

SECTION AN109
FIRE PROTECTION SYSTEMS

AN109.1 General. Fire department access, fire-fighting water supply, and fire hydrants for structures regulated by this appendix shall be installed as specified in the *Oregon Fire Code*.

AN109.2 Fire sprinkler systems. An automatic sprinkler system shall be installed throughout all buildings designed and constructed to the provisions of Section AN103.2.2.

Exception: Automatic sprinkler systems are not required in buildings designed and constructed to the provisions of Section AN103.2.3.

AN109.2.1 Installation requirements. Automatic sprinkler systems shall be installed in accordance with the standards listed in Chapter 43 and the following:

Quick-response and residential sprinklers. Where automatic sprinkler systems are required, quick-response or residential automatic sprinklers shall be installed in the dwelling units.

Water supplies. Potable water supplies shall be protected against backflow in accordance with the requirements of the *Oregon Plumbing Specialty Code* and the standards referenced in Chapter 43 of this code.

Common domestic/fire mains. A single common water supply main shall be permitted to service both the domestic use and fire sprinklers. Domestic demand shall be included as part of the overall system demand for systems with common domestic/fire mains where no provisions are made to prevent the domestic water flow upon sprinkler system activation.

Hose threads. Fire hose threads used to provide connection with automatic sprinkler systems shall be approved and compatible with fire department hose threads.

Fire department connections. The location of the fire department connection shall be approved by the authority having jurisdiction.

Sprinkler system monitoring and alarms. All valves controlling the water supply for automatic sprinkler systems, pumps, tanks, water levels and temperatures, critical air pressures and waterflow switches on all sprinkler systems serving 20 or more heads, shall be electrically supervised.

An approved audible sprinkler flow alarm shall be provided on the exterior of the building in an approved location. An approved audible sprinkler flow alarm to alert the occupants shall be provided in the interior of each dwelling unit in a normally occupied location. Actuation of the alarm shall be in accordance with NFPA 72.

Balconies, decks and patios. Sprinkler protection shall be provided for exterior balconies, decks and ground-floor patios serving dwelling units in buildings regulated by this appendix chapter. Sidewall sprinklers that are used to protect such areas shall be permitted to be located such that their deflectors are within 1 inch (25 mm) to 6 inches (152 mm) below the structural members, and a maximum distance of 14 inches (356 mm) below the deck of the exterior balconies that are constructed of open wood joist construction.

Exception: The sprinkler protection may be omitted if the balcony, deck or patio is constructed of noncombustible materials and there are no vents or other openings into enclosed soffits or attics located directly over the balcony, deck or patio.

AN109.3 Access roads and fire hydrants. See the *Oregon Fire Code* for distance requirements for access roads and fire hydrants.

AN109.4 Alternate fire sprinkler system requirements. The requirements of this section are adopted by the State of Oregon for optional use in municipalities.

AN109.4.1 Local adoption. The provisions of AN109.3 apply only when specifically adopted by the local authority having jurisdiction.

AN109.4.2 Group R, Division 2 Occupancies. An automatic sprinkler system shall be installed throughout every apartment house.

Exception: Automatic sprinkler systems are not required in apartment buildings that are one story in height and do not contain a basement or mezzanine. Such buildings shall not contain more than 16 dwelling units.

AN109.4.2.1 Sprinkler heads. Residential or quick response automatic sprinkler heads shall be used within the dwelling units.

AN109.4.3 Alteration or damage of existing nonsprinkled low-rise residential dwellings. Where substantial alterations are made or substantial damage occurs to an existing non-sprnkled building designed and constructed under the provisions of this appendix, an approved automatic sprinkler system complying with NFPA 13D shall be installed only in the altered or damaged dwelling units. When more than 50 percent of the dwelling units within a building are substantially altered or damaged, the entire building shall be provided with an NFPA 13D sprinkler system.

SECTION AN110
MEANS OF EGRESS

AN110.1 General. Every building or portion thereof shall be provided with a means of egress complying with this section and such other sections as applicable. A means of egress is an exit system that provides a continuous, unobstructed and undiminished path of exit travel from any occupied point in a building or structure to a public way. A means of egress system includes elements such as stairways, ramps, exterior exit balconies, hallways and doors.

Means of egress shall be maintained in accordance with the *Oregon Fire Code*.

AN110.2 Building accessibility. In addition to the requirements of this chapter, means of egress which provides access to, or egress from buildings for persons with disabilities, shall comply with the requirements of Chapter 11 of the *Oregon Structural Specialty Code*.

AN110.3 Occupant load. The basis for the design of the means of egress system is the occupant load served by the various components of such system. Occupant loads shall be determined in accordance with the provisions of this section and Table 110.3. In determining the occupant load, all portions of a building shall be presumed to be occupied at the same time.

Exception: Incidental use areas that ordinarily are used only by the persons who occupy the main areas of an occupancy shall be provided with means of egress as thought they are completely occupied, but their occupant load need not be included when computing the occupant load of the building.

The occupant load of yards, patios, courts and similar outdoor areas shall be assigned by the building official in accordance with the anticipated use of such areas. Such outdoor areas accessible and usable by the building occupants shall be provided with a means of egress as required by this chapter. Where an outdoor area exits only through a building, the occupant load of such outdoor area shall be considered in the design of the means of egress system of the building.

Exceptions:

1. Outdoor areas used exclusively for the service of the building need only have one means of egress.
2. Outdoor areas associated with and only accessible through an individual dwelling unit.

TABLE AN110.3
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

OCCUPANCY/USE	FLOOR AREA IN SQ. FT. PER OCCUPANT	MINIMUM OF TWO MEANS OF EGRESS WHEN THE OCCUPANT LOAD REACHES
Common use areas such as roof decks, courtyards, exterior exit balconies, etc.	15 net	30
Residential dwelling units	200 gross	10

For SI: 1 square foot = 0.0929m^2.

AN110.4 Means of egress components. The requirements specified in this section shall apply to all three elements of the means of egress system.

AN110.4.1 Exit access. Exits shall be provided from each building level. Additionally, access to such exits shall be provided from all occupied areas within the building levels. The maximum number of exits required from any story, basement or individual space shall be maintained until arrival at grade or the public way.

AN110.4.1.1 From individual floors. For the purpose of this section, floors, stories, occupied roofs and similar designation of buildings levels other than basements shall be considered synonymous.

Every occupant on the first story shall have access to not less than one exit and not less than two exits when required by Table AN110.3. Every occupant in a basement and on stories other than the first story shall have access to not less than two exits.

Access to an exit shall not be permitted through either a private residential parking garage, carport, incidental use area or swimming pool area.

Exceptions:

1. Second stories having an occupant load less than 10 may be provided with access to only one exit.
2. Two or more dwelling units on the second story or in a basement may have access to only one exit where the total occupant load served by the exit does not exceed 10.
3. Except as provided in Table AN110.3 access to only one exit need be provided from the second floor or a basement with in an individual dwelling unit.
4. Where the third floor within an individual dwelling unit does not exceed 500 square feet (46.45 m^2), access to only one exit need be provided from that floor level.
5. Occupied roofs serving only one individual dwelling unit and having access only through such dwelling unit may have access to only one exit where such occupied areas are less than 500 square feet (46.45 m^2) and are located no higher than immediately above the second story.
6. Floors and basements used exclusively for the service of the building and incidental uses al-

lowed by Section AN103.3.4 and Table AN103.3.4 may have access to only one exit.

AN110.4.1.2 From individual spaces. All occupied portions of the building shall have access to not less than one exit or exit access doorway. Access to not less than two exits or exit access doorways or combination thereof shall be provided when the individual or cumulative occupant load served by a portion of the exit access is equal to or greater than that listed in Table AN110.3.

Exception: Storage rooms, laundry rooms and other incidental use areas allowed by Section AN103.2.1 may be provided with access to only one exit doorway.

AN110.4.2 The exit. The exit is that portion of the means of egress system between the exit access and the exit discharge or the public way.

Doors of exit components that open directly to the exterior of a building shall not be located in areas where openings are required to be protected due to location on property. Exterior exit doors shall lead directly to the exit discharge or the public way.

AN110.4.2.1 Separation of exits. Where two or more exits are required from any level or portion of the building, at least two of the exits shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the area served measured in a straight line between the center of such exits. Additional exits or exit-access doorways shall be arranged a reasonable distance apart so that if one becomes blocked, the others will be available. Where more than one exit is required from the exterior exit balcony, the exit access shall be arranged such that there are no dead ends more than 20 feet (6096 mm) in length.

Exception: Where a building is sprinklered in accordance AN109 the separation distance of the exit or exit access doorways may be reduced to not less than one-third of the length of the maximum overall diagonal measure of the area served.

AN110.4.3 The exit discharge. The exit discharge is that portion of the means of egress system between the exit and the public way. Components that may be selectively included in the exit discharge include exterior exit balconies, exterior exit stairways, exterior exit ramps, exit courts and yards.

Exception: When approved by the building official, the exit discharge may lead to a safe dispersal area on the same property as the building being exited.

Grade level areas designated as an exit discharge component shall be permanently maintained. Such areas shall not be developed or otherwise altered in their capacity to provide for a continuous, unobstructed and undiminished means of egress for building occupants.

The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter the building. Exterior exit balconies, exterior exit stairways and exterior exit ramps shall not be located in areas where openings are prohibited or required to be protected due to location on the property.

The travel distance in the exit discharge at grade shall not be limited.

Where the exit from a building discharges at other than grade level, there shall be not less than two separate paths of exit travel to grade level. Such paths of exit travel shall be arranged so there are no dead ends more than 20 feet (6096 mm) in length.

AN110.5 Egress width. The minimum egress width shall not be less than 36 inches (914 mm).

Doors opening into the path of egress shall not reduce the required width to less than one-half during the course of the swing. When fully opened the door shall not project more than 7 inches (178 mm) into the required width.

Exception: The restriction on a door swing shall not apply to doors within individual dwelling units.

AN110.6 Means of egress height. Except as may be specified elsewhere in this code and where sloped ceilings are allowed by other provision of this code, the means of egress system shall have a clear height of not less than 7 feet (2134 mm) measured vertically from the walking surface to the lowest projection from the ceiling or overhead structure.

Protruding objects are permitted to extend below the minimum ceiling height required by this section provided a minimum headroom of 80 inches (2032 mm) shall be provided for any walking surface, including walks, and exit balconies. Not more than 50 percent of the ceiling area of a means of egress shall be reduced by protruding objects.

Exception: Door closers and stops shall not reduce headroom to less than 78 inches (1981 mm).

AN110.7 Means of egress continuity. The path of exit travel along a means of egress shall not be interrupted by any building element other than a means of egress component. Obstructions shall not be placed in the required width of the means of egress except projections permitted by this chapter. The required capacity of a means of egress shall not be diminished along the path of exit travel.

All exterior elevation changes and interior elevation changes of 12 inches (305 mm) or more along the path of exit travel shall be made by steps conforming with the requirements of Section AN110.16.3 or by ramps complying with Section AN110.22.

AN110.8 Means of egress illumination. The means of egress system including the exit discharge shall be illuminated at all times the building space served by the means of egress is occupied.

Exceptions:

1. Within individual dwelling units
2. Within attached or detached private residential parking garages.
3. Interior exit discharge elements in building required to have two or more exits.

The means of egress illumination level shall be not less than 1 foot-candle (11 lux) at the floor level.

The power supply for the means of egress illumination shall normally be provided by the premise's electrical supply.

In the event of power failure, an emergency electrical system shall automatically illuminate the following areas:

1. Exterior exit balconies and exit stairways located in buildings required to have two or more exits.
2. Exterior egress components at other than the level of exit discharge until exit discharge is accomplished for buildings required to have two or more exits.
3. The portion of the exterior exit discharge immediately adjacent to exit discharge doorways in buildings required to have two or more exits.

The emergency power system shall provide for a duration of not less than 90 minutes and shall consist of storage batteries, unit equipment or an on-site generator. The installation of the emergency power system shall be in accordance with *Oregon Electrical Specialty Code*.

AN110.9 Exit signs. Except as listed below, exits and exit access doors shall be marked by an approved exit sign readily visible from any direction of egress travel. Access to exits shall be marked by readily visible exit signs in cases where the exit or the path of egress in not immediately visible to the occupants. Exit sign placement shall be such that no point along and egress path is more than 100 feet (30 480 mm) or the listed viewing distance for the sign, whichever is less, from the nearest exit sign.

Exception: Exits signs shall not be required in the following locations:

1. Within individual dwelling units
2. Within attached or detached private residential parking garages.
3. In rooms or areas which require only one exit or exit access.
4. At main exterior exit doors or gates which are obviously and clearly identifiable as exits when approved by the building official.

AN110.10 Emergency escape and rescue openings. Basements with habitable space and every sleeping room shall have at least one openable emergency escape and rescue window or exterior door opening complying with the requirements of Section R310.

AN110.11 Exterior exit balconies, exit stairways and exit ramps. Exterior exit balconies, stairways and ramps shall meet the requirement of this section.

AN110.11.1 Exterior exit balconies. An exterior exit balcony is a balcony, landing or porch projecting from the wall of a building and serves as an exit discharge component in a means of egress system.

AN110.11.2 Width. The width of exterior exit balconies shall be not less than 36 inches (914 mm).

AN110.11.3 Openness. The long side of an exterior exit balcony shall be at least 50 percent open, and the open area above the guardrail shall be distributed to prevent the accumulation of smoke or toxic gases.

AN110.11.4 Fire-resistive-rated construction. Walls of exterior exit balconies serving an occupant load of 10 or more shall be of 1-hour fire-resistive construction and ceilings shall be of not less than that required for 1-hour fire-resistive floor or roof system.

Exceptions:

1. Exterior sides of exterior exit balconies.
2. The exterior exit balcony roof may be of heavy-timber construction without concealed spaces.
3. Balconies and similar structures or appendages of Types III, IV and V construction shall be permitted to be of Type V non-rated construction where fire sprinkler protection is extended to protect the entire area under consideration.

AN110.11.5 Exterior exit stairways. An exterior exit stairway serves as an exit discharge component in a means of egress system and is open on at least one side as defined in Section AN102. Any stairway not meeting the definition of an exterior stairway shall comply with the requirements for interior stairways. Exterior exit stairways shall comply with the applicable requirements for stairways as specified in Section AN110.16.

AN110.11.6 Exterior exit ramps. An exterior exit ramp serves as an exit discharge component in a means of egress system and is open on at least one side. Exterior exit ramps shall comply with the applicable requirements for ramps as specified in Section AN110.22.

AN110.11.7 Space under exit balconies, exit stairways and exit ramps. There shall be no enclosed usable space under exterior exit stairways and exit ramps. The open space under such stairways shall not be used for any purpose.

AN110.11.8 Proximity to openings. All openings in the exterior wall below and within 10 feet (3048 mm), measured horizontally, of an exterior exit stairway or exit ramp serving a building over two stories in height or a floor level having such openings in two or more floors below shall be protected by fixed or self-closing fire assemblies having a $^{3}/_{4}$-hour fire protection rating.

Exception: Openings may be unprotected when two separated exterior stairways or ramps are served by a common exterior exit balcony.

AN110.11.9 Attachment. Required exterior exit balconies, stairs and similar exit facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces. Such attachment shall not be accomplished by use of toenails or nails subject to withdrawal.

AN110.12 Exit courts. An exit court is a court or yard that provides access to a public way for one or more required exits.

AN110.12.1 The width of exit courts shall be as determined by the occupant load served but such width shall be not less than 44 inches (1118 mm).

Exception: An exit court serving only one individual dwelling unit or a private residential parking garage may be 36 inches (914 mm) in width.

The required width of exit courts shall be unobstructed to a height of 7 feet (2134 mm).

Exception: Doors when fully opened, and handrails shall not reduce the required width by more than 7 inches

(178 mm). Doors in any position shall not reduce the required width by more than one-half. Other nonstructural projections such as trim and similar decorative features may project into the required width 1 1/2 inches (38 mm) from each side.

When an exit court exceeds the required width and the width of such exit court is then reduced along the path of exit travel, the reduction in width shall be gradual. The transition shall be affected by a guardrail not less than 36 inches (914 mm) in heights and shall not create an angle of more than 30 degrees with respect to the axis of the exit court along the path of exit travel. In no case shall the width of the exit court be less than the required minimum width.

When an exit court serving a building or portion thereof having an occupant load of 10 or more is less than 10 feet (3048 mm) in width, the exit court walls shall be not less than 1-hour fire-resistive construction for a distance of 10 feet (3048 mm) above the floor of the court. All openings therein shall be protected by fixed or self-closing fire assemblies having a 3/4-hour fire-protection rating.

AN110.13 Exit doors. Not less than one exit door conforming to this section shall be provided for each dwelling unit. The required exit door shall provide for direct access from the habitable portions of the dwelling to the exterior without requiring travel through a garage or carport. Where additional doors are installed for egress purposes, they shall conform to all the requirements of this section.

AN110.13.1 Door type and size. The required exit door shall be a side-hinged door not less than 3 feet (914 mm) in width and 6 feet, 8 inches (2032 mm) in height. Where installed, exit doors shall be capable of opening such that the clear width of the exit is not less than 32 inches (813 mm) measured between the face of the door and the stop when the door is open 90 degrees (1.57 rad).

Exceptions:

1. The minimum and maximum width shall not apply to door openings that are not a part of the required means of egress from or within individual dwelling units.
2. Door openings within a dwelling unit shall be not less than 78 inches (1981 mm) in height.
3. Exterior door openings in dwelling units other than the required exit door, shall be not less than 76 inches (1930 mm) in height.
4. Interior egress doors within a dwelling unit which is not required to be adaptable or accessible.
5. Door openings required by Chapter 11 of the *Oregon Structural Specialty Code* to be accessible within dwelling units shall comply with Chapter 11.

AN110.13.2 Glazing. Glass doors and glazed panels in proximity of doors shall conform to the requirements of Section R308.

AN110.13.3 Type of lock or latch. All egress doors shall be readily openable from the side from which egress is to be made without the use of a key or special knowledge or effort.

AN110.14 Gates. Gates used as a component in a means of egress system shall conform to the applicable requirements for doors.

AN110.15 Floor elevation. There shall be a floor or landing on each side of a door. Such floor or landing shall be at the same elevation on each side of the door. Landings shall be level except for exterior landings, which are permitted to have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2-percent slope).

Exceptions:

1. Within individual dwelling units, a door is permitted to open at the top step of an interior flight of stairs, provided the door does not swing over the top step.
2. Screen doors and storm doors are permitted to swing over stairs or landings.

AN110.15.1 Landings at doors. Landings shall have a width not less than the width of the stairway or the door, whichever is the greatest. Doors in the fully open position shall not reduce a required dimension by more than 7 inches (178 mm). Landings shall have a length measured in the direction of travel of not less than 44 inches (1118 mm).

Exception: Landings within individual dwelling units need not exceed 36 inches (914 mm) in the direction of travel.

AN110.15.2 Thresholds. Except where otherwise required to be accessible, the floor or landing at a door serving an individual dwelling unit shall not be more than 1.5 inches (38 mm) lower than the top of the threshold.

Exception: Exterior doors that are not part of the required means of egress and are not on an accessible route may have the exterior landing not more than 7 3/4 inches (197 mm) below the threshold of the door.

AN110.16 Stairways. Every stairway having two or more risers shall comply with the requirements of this section. The term "stairway" shall include stairs, landings, handrails and guardrails as applicable. The term "step" shall mean those portions of the means of egress achieving a change in elevation by means of a single riser. Individual steps shall comply with the detailed requirements of this section that specify applicability to steps.

Exception: Stairs or ladders used only to attend equipment or window wells are exempt from this section.

AN110.16.1 Width. Stairways shall not be less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. Handrails shall not project more than 3 1/2 inches (88.6 mm) on either side of the stairway and the minimum clear width of the stairway at and below the handrail height, including treads and landings, shall not be less than 32.5 inches (823.3 mm) where a handrail is installed on one side and 29 inches (734.6 mm) where handrails are provided on both sides.

Exceptions:

1. The width of spiral stairways shall be in accordance with Section AN110.20.
2. Where a floor within an individual dwelling unit is served by more than one stairway, stairways other than the first stairway may have a clear width of

not less than 30 inches (762 mm). Any handrail may encroach a maximum of $3^1/_2$ inches (88.6 mm) into the clear width.

3. Stairways serving an occupant load of 50 or more shall have a width as determined by calculated occupant load but shall be not less than 44 inches (1118 mm) in width.

AN110.16.2 Headroom. The minimum headroom in all parts of the stairway shall not be less than 6 feet, 8 inches (2036 mm) measured vertically from a plane parallel and tangent to the stairway tread nosing to the soffit or other construction above at all points and shall be continuous for the full width of the stair to the point where the line intersects the landing below, one tread depth below the bottom riser.

AN110.16.3 Treads and risers. The maximum riser height shall be 7 inches (203 mm) and the minimum tread depth shall be 11 inches (229 mm). The riser height shall be measured vertically between leading edges of the adjacent treads. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of the adjacent treads and at right angle to the tread's leading edge. The walking surface of treads and landings of stairways shall be sloped no steeper than one unit vertical in 48 units horizontal (2-persent slope). The greatest riser height within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm). Stair treads shall be of uniform size and shape, except the largest tread run within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm). Winder treads shall have a minimum tread depth of 11 inches (279 mm) measured at a right angle from the side where the treads are narrower and a minimum tread depth of 10 inches (254 mm). The greatest winder tread depth at the 12 inch (305 mm) walk line within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

Exceptions:

1. Circular stairs within individual dwelling units constructed in accordance with Section AN110.20.
2. Spiral stairs within individual dwelling units constructed in accordance with Section AN110.20.
3. Winders within individual dwelling units constructed in accordance with Section AN110.20.
4. Riser height for interior and exterior egress stairs serving only one dwelling unit, stairs within individual dwelling units, and stairs associated with either attached or detached private residential parking garages is allowed to be 8 inches (197 mm) maximum and the tread depth is allowed to be 9 inches (254 mm) minimum.
5. Where the bottom or top riser adjoins a sloping public way, sidewalk, garage floor or driveway having an established grade and serving as a landing, the bottom or top riser may be reduced to less than 4 inches (102 mm) in height with the variation in the height of the bottom or top riser not to exceed 1 unit vertical in 12 units horizontal (8.3 percent slope) of stairway width.

AN110.16.4 Profile. The radius of curvature at the leading edge of the tread shall be not greater than 0.5 inch (12.7 mm). Beveling of nosings shall not exceed 0.5 inch (12.7 mm). Risers shall be solid and vertical or sloped from the underside of the leading edge of the tread above at an angle not more than 30 degrees (0.52 rad) from the vertical. The leading edge (nosings) of treads shall project not more than 1.25 inches (32 mm) beyond the tread below and all projections of the leading edges shall be of uniform size, including the leading edge of the floor at the top of a flight.

Exceptions:

1. Solid risers are not required for stairways, provided that the opening between treads does not permit the passage of a sphere with a diameter of 4 inches (102 mm).
2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.
3. Interior and exterior egress stairs serving only one dwelling unit, stairs within individual dwelling units, and stairs associated with either attached or detached Group U occupancies may have profiles in accordance with Section R311.5.3.3.

AN110.17 Landings for stairways. There shall be a floor or landing at the top and bottom of each stairway or stair run.

AN110.17.1 Width. Every landing shall have a dimension measured in the direction of exit travel not less than the width of the stairway. Such dimension need not exceed 44 inches (1118 mm) where the stair has a straight run. Landings shall be level except that exterior landings may have a slope not to exceed 0.25 unit vertical in 12 units horizontal (2 percent slope).

Exceptions:

1. In individual dwelling units and in either attached or detached private residential parking garages, such length need not exceed 36 inches (914 mm) where the stairs have a straight run.
2. At the top of an interior flight of stairs, provided a door does not swing over the stairs.
3. Stairways serving an unoccupied roof are exempt from these requirements.

AN110.17.2 Verticle rise. A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

AN110.17.3 Walking surface. The walking surface of treads and landings of stairways shall be sloped no steeper than one unit vertical in 48 inches horizontal (2-percent slope) in any direction and shall have a solid surface. Finish floor materials shall be securely attached.

AN110.18 Handrails. Handrails shall be provided on both sides of each continuous run of treads or flights with two or more risers.

Exceptions:

1. Stairways having less than four risers that are within individual dwelling units or in private residential

parking garages attached to individual dwelling units need not be provided with handrails.

2. Stairways serving only one dwelling unit may have a handrail on only one side.

AN110.18.1 Installation height. Handrails shall be installed at a height of 34 inches (9864 mm) minimum and 38 inches (965 mm) maximum, measured vertically from the nosing of the treads. All required handrails shall be continuous the full length of the stairs and at least one handrail shall extend in the direction of the stair run not less than 12 inches (305mm) beyond the top riser nor less than 12 inches (305 mm) beyond the bottom riser.

Exceptions:

1. Stairways within individual dwelling units and in residential garages accessory to individual dwelling units and stairways serving only one dwelling shall be installed at a height of 30 inches (762 mm) minimum and 38 inches (965 mm) maximum.
2. Handrails shall be permitted to be interrupted by a newel post at a turn.
3. Stairways within individual dwelling units and in residential garages accessory to individual dwelling units and private stairways do not require handrail extensions.

AN110.18.2 Temination. Ends shall be returned or shall terminate in newel post or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1.5 inches (38mm) between the wall and the handrail.

Exception: The use of a volute, turnout or starting easing shall be allowed over the lowest tread at stairways within individual dwelling units.

AN110.18.3 Cross section. The handgrip portion of the handrails shall have a circular cross section of $1^1/_4$ inches (32 mm) minimum to a 2 inches (51 mm) maximum. Other handrail shapes that provide an equivalent grasping surface are permissible. The handgrip portion of handrails shall have a smooth surface with no sharp corners.

AN110.19 Stairway illumination. All stairs shall be provided with illumination in accordance with Sections AN110.8 and R303.6.

AN110.20 Special stairways. Circular stairways, spiral stairways, winders and bulkhead enclosure stairways shall comply with all requirements of Section AN110.16 except as specified in the next section.

AN110.20.1 Spiral stairways. Spiral stairways are permitted as a means of egress within individual dwelling units and in other occupancies where the area served is limited to 250 square feet (23 m^2) in area and an occupant load of not more than five occupants. The tread shall provide a clear walking area measuring at least 26 inches (660 mm) from the outer edge of the supporting column to the inner edge of the handrail. The effective tread is delineated by the nosing radius line, the exterior arc (inner edge of railing) and the overlap radius line (nosing radius line of tread above). Effective tread dimensions are taken along a line perpendicular to the center line of the tread. A run of at least $7^1/_2$ inches (190 mm) measured at a point 12 inches (305 mm) from where the tread is narrowest. The rise shall be sufficient to provide a headroom clearance of not less than 6 feet, 6 inches (1981 mm); however, such rise shall not exceed $9^1/_2$ inches (241 mm).

AN110.20.2 Winders. Winders are permitted as a means of egress within individual dwelling units; provided that the width of the tread at a point not more than 12 inches (305 mm) from the side where the treads are narrower is not less than 10 inches (254 mm) and the minimum width of any tread is not less than 6 inches (152 mm). The continuous handrail required by Section AN110.16 shall be located on the side where the tread is narrower.

AN110.20.3 Circular stairways. Circular stairways conforming to the requirements of this section may be used as a means of egress component in any occupancy. The minimum width of run shall not be less than 11 inches (279 mm), or 10 inches (254 mm) within individual dwelling units, measured at a point 12 inches (305 mm) from the narrow end of the tread. The smaller stairway radius shall not be less than twice the width of the stairway. The minimum tread depth shall be not less than 10 inches (254 mm), or 9 inches (229 mm) within individual dwelling units.

AN110.21 Under stair protection. Enclosed accessible space under stairs within individual dwelling units shall have walls, under stair surface and any soffits protected on the enclosed side with $^5/_8$ inch (12.7 mm) Type X gypsum board. Exterior exit stairs shall not have enclosed, accessible space under the stair.

AN110.22 Ramps used as a component in a means and egress system shall conform to the requirements of Section R311.6, this section and where applicable, Chapter 11 of the *Oregon Structural Specialty Code*.

AN110.22.1 Width. The width of ramps shall not be less than 36 inches (914 mm) in width. Handrails may project into the required width a distance of $3^1/_2$ inches (89 mm) from each side of a ramp. Other projections such as trim and similar decorative features, may project into the required width $1^1/_2$ inches (38 mm) from each side.

AN110.22.2 Cross slope. The cross slope of ramps, measured perpendicular to the direction of travel, shall not be steeper than one unit vertical to 48 units horizontal (2-percent slope).

AN110.22.3 Landings. Ramps having slope steeper than one unit vertical in 20 units horizontal (5 percent slope) shall have landings at the top and bottom, and at least one intermediate landing shall be provided for each 5 feet (1524 mm) of vertical riser measured between the horizontal planes of adjacent landings. Landings shall have a dimension measured in the direction of ramp run of not less than 5 feet (1524 mm).

Doors in any position shall not reduce the minimum dimension of the landing to less than 42 inches (1967 mm) and shall not reduce the required width by more than 7 inches (177 mm) when fully open.Where ramp access is provided to comply with the requirements of Chapter 11 of the *Oregon Structural Specialty Code* and a door swings over a landing, the landing shall extend at least 24 inches (610 mm) beyond the latch edge of the door, measured parallel to the

door in the closed position, and shall have a length measured in the direction of travel through the doorway of not less than 5 feet (1524 mm).

AN110.22.4 Handrails. Ramps having slopes steeper than 1 unit vertical in 20 units horizontal (5% slope) shall have rails as required for stairways.

Exception: For buildings that are not required to be accessible, handrails are required only on portions of exterior ramps that extend from the exit to the exterior grade.

AN110.22.5 Guards. Ramps and landings at ramps open on one or both sides shall have guards as required by Section AN110.23.

AN110.22.6 Surface. The surface of ramps shall be roughened or shall be of slip-resistant materials and where outdoors shall be designed so that water will not accumulate on walking surfaces.

AN110.23 Guards required. Unenclosed floor or roof openings, open and glazed sides of stairways, landings and ramps, balconies or porches more than 30 inches (762 mm) above grade or floor below, and roofs used for other than service of the building shall be protected by a guardrail.

AN110.23.1 Height. The top of guardrails shall be not less than 42 inches (1067 mm) in height.

Exceptions:

1. The top of guardrails within individual dwelling unit may be 36 inches (914 mm) in height.
2. The top of guardrails for stairways, exclusive of landings, may have a height as specified for handrails.

AN110.23.2 Intermediate rails. Open guardrails shall have intermediate rails or an ornamental closure that does not allow the passage of a sphere 4 inches (102 mm) in diameter.

Exceptions:

1. The triangular openings formed by the riser, tread and bottom rail of a guardrail at the open side of a stairway are permitted to be such that a sphere 6 inches (152 mm) cannot pass through.
2. Required guardrails on open sides of stairways within an individual dwelling unit shall have intermediate rails or ornamental closure which do not allow the passage of an object 5 inches (127 mm) or more in diameter. Opening limitations for required guardrails on open sides of stairways are applicable above the second riser of the stair.

SECTION AN111
ACCESSIBILITY

AN111.1 General. Buildings that meet the definition of a "Covered multiple-family dwelling" that do not require an elevator are required to be constructed in accordance with *Oregon Structural Specialty Code* Chapter 11. Building regulated by this appendix that require an elevator in accordance with ORS 447.210(5) are beyond the scope of this appendix and shall be constructed in accordance with the Building Code.

COVERED MULTIPLE-FAMILY DWELLINGS. Multiple-family dwellings "covered" by (included in the scope of) ORS 447.210.(5).

ORS 447.210(5) is not part of this code but is reproduced here for the reader's convenience.

ORS 447.210(5) "Covered multifamily dwellings" means buildings consisting of four or more dwelling units if such buildings have one or more elevators, and ground floor dwelling units in other buildings consisting of four or more dwelling units. Dwelling units within a single structure separated by firewalls do not constitute separate buildings.

ORS 447.210(5) is not part of this code but is reproduced here for the reader's convenience.

SECTION AN112
FOUNDATIONS, CONCRETE AND SOILS

AN112.1 Foundations. Foundations for buildings, when designed, shall be designed in accordance with the *Oregon Structural Specialty Code*.

AN112.1.1 Soil liquefaction. The potential for seismically induced liquefaction, soil instability and other applicable factors shall be evaluated as provided in the *Oregon Structural Specialty Code* or the local ordinance.

AN112.2 Concrete. The placement, forming, curing shall be in accordance with the *Oregon Structural Specialty Code*.

SECTION AN113
CHIMNEYS AND FIREPLACES

AN113.1 Chimneys and fireplaces. Chimneys and fireplaces shall be constructed and installed in accordance with Chapter 10 of this code.

SECTION AN114
WOOD

AN114.1 General. Wood shall conform to the referenced standards in Chapter 43 of this code and the *Oregon Structural Specialty Code* and design and construction to conventional light frame requirements of the *Oregon Structural Specialty Code* shall be permitted.

SECTION AN201
MECHANICAL

AN201.1 General. Mechanical installations shall be in accordance with this appendix and Chapters 12 through 24 of this code.

AN201.2 Construction documents. Construction documents for buildings more than two stories in height shall indicate where penetrations will be made for mechanical systems.

AN201.3 Private residential parking garage ventilation requirements. Parking garages used for multiple-unit parking shall be provided with outdoor ventilation air at a rate of 1.5 cfm/ft^2. The ventilation systems shall be provided with manual or automatic controls that will operate such systems whenever the space is occupied.

AN201.4 Roof top mechanical installations. Where equipment and appliances requiring access are installed on roofs or elevated structures at a height exceeding 16 feet (4877 mm), or where appliances, equipment, fans or other components requiring service are located within 10 feet (3048 mm) of a roof edge, or where appliances are installed on a roof having a slope of three units vertical in 12 units horizontal (25-percent slope) or greater, they shall meet the requirements found in Sections 304.10, 306.5 and 306.6 of the *Oregon Mechanical Specialty Code*.

AN201.5 Duct penetrations. Where penetration of a fire-resistive assembly is beyond the scope of Section AN104.6, the provisions of Section 607 in the *Oregon Mechanical Specialty Code* shall govern the protection of duct penetrations and air transfer openings in fire-resistance-rated assemblies.

SECTION AN301
PLUMBING SYSTEMS

Plumbing systems and fixtures shall be provided in accordance with provisions contained in Chapters 25 through 32 of this code.

SECTION AN401
ELECTRICAL

Electrical systems and fixtures shall be provided in accordance with provisions contained in Chapters 33 through 42 of this code.

SECTION AN501
SPECIAL CONSTRUCTION

AN501.1 General. The following items are not a part of this code but, when used, are to be constructed under the *Oregon Structural Specialty Code*.

1. Pedestrian walkways and tunnels.
2. Awnings and canopies.
3. Marquees.
4. Signs.
5. Swimming pool enclosures and safety devices.

SECTION AN601
SPECIAL PROVISIONS

AN601.1 General. When applicable to structures designed and constructed using this section, see the *Oregon Structural Specialty Code*.

PATIO COVERS
(adopted for optional use in municipalities)
See *Oregon Structural Specialty Code*

GRADING
(adopted for optional use in municipalities)
See *Oregon Structural Specialty Code*

WILDFIRE HAZARD MITIGATION
(adopted for optional use in municipalities)
See *Oregon Structural Specialty Code*

SECURITY PROVISIONS
(adopted for optional use in municipalities)
See *Oregon Structural Specialty Code*

REROOFING
(adopted by the state of Oregon)
See *Oregon Structural Specialty Code*

EARTHQUAKE RECORDING INSTRUMENTATION
(adopted by the state of Oregon)
See *Oregon Structural Specialty Code*

WATERPROOFING AND DAMPPROOFING FOUNDATIONS
(adopted by the state of Oregon)
See *Oregon Structural Specialty Code*

PROTECTION OF RESIDENTIAL CONCRETE EXPOSED TO FREEZING AND THAWING
(adopted by the state of Oregon)
See *Oregon Structural Specialty Code*