ARTICLE I.
RESIDENTIAL CODE

Sec. 11-1. Adopted.

The *International Residential Code*, 2012 2009 edition including Appendix E, Appendix G, and Appendix H as published by the International Code Council Inc. as amended is hereby adopted as the residential building code by the city for regulating the design, construction, quality of materials, erection, installation, alteration, movement, repair, equipment, use and occupancy, location, removal, and demolition of detached one- and two-family dwellings and town houses not more than three stories in height with a separate means of egress and their accessory structures, and provides for the issuance of permits and the collection of fees therefor. The minimum building standards in the 2012 2009 edition of the *International Residential Code* and amendments thereto shall be applied to any building permit issued after April 30, 2013 May 31st, 2010. A printed copy as amended is on file with the city clerk.

Sec. 11-2. Amendments, additions, and deletions to the 2012 *International Residential Code*.

The following sections and subsections of the 2012 *International Residential Code* adopted in this article shall be amended, added, or not adopted by the city as follows. All other sections or subsections of the 2012 *International Residential Code* as published shall remain the same.

**R101.1 Title.** These provisions shall be known as the Residential Code for One- and Two-family Dwellings of the city of Sioux Falls, and shall be cited as such and will be referred to herein as “this code.”

Commentary: This simply inserts that these local modifications are applicable to the “City of Sioux Falls.”

**R101.2 Scope.** The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures.

Exceptions:

1. Live/work units complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two-family dwellings or town houses. Fire suppression required by Section 419.5 of the *International Building Code* when constructed under the *International Residential Code for One- and Two-family Dwellings* shall conform to Section P2904.

2. Owner-occupied lodging houses with five or fewer guestrooms shall be permitted to be constructed in accordance with the *International Residential Code for One- and Two-
family Dwellings when equipped with a fire sprinkler system in accordance with Section P2904.

3. Existing buildings undergoing repair, alteration or additions, and change of occupancy may be permitted to comply with the International Existing Building Code.

Commentary: This section establishes when the provisions of the residential code apply, whether all or in part. The amendment is to clarify that instead of only using the provision of the IRC for repairs, remodels, alterations, changes of use, etc., that the designer or building owner has the ability to use the scoping provisions of the International Existing Building Code as an alternate.

R103.1 Creation of Enforcement agency. The department of building safety Building services is hereby created and the official in charge thereof shall be known as the building official.

Commentary: This inserts the correct title of the office that enforces minimum building standards, Building Services.

R103.2 Appointment. Building services is hereby created and the official in charge thereof shall be known as the building official. The building official shall be appointed by the chief appointing authority of the jurisdiction.

Commentary: This is eliminated because the building official is not an appointed position.

R104.8 Liability. The building official, member of the board of appeals or employee charged with the enforcement of this code, while acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered liable personally and is hereby relieved from personal liability for any damage accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties. Any suit instituted against an officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be afforded all the protection provided by the city’s insurance pool and any immunities and defenses provided by other applicable state and federal law and defended by legal representative of the jurisdiction until the final termination of the proceedings. The building official or any subordinate shall not be liable for cost in any action, suit or proceeding that is instituted in pursuance of the provisions of this code.

This code shall not be construed to relieve from or lessen the responsibility of any person owning, operating, or controlling any building or structure for any damages to persons or property caused by defects, nor shall the code enforcement agency or the city be held as assuming any such liability by reason of the inspection authorized by this code or any permits or certificates issued under this code.

Commentary: This amendment inserts that an employee who enforces the code is protected from liability within the limitations of the City’s insurance pool or any other applicable state or federal law. The second paragraph maintains language from the legacy codes as it relates to assuming liability in the enforcement of the minimum building standards of the code.
R105.1 Required. Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the building official and obtain the required permit. The building official may exempt permits for minor work.

Exclusive of a homeowner, no person or firm shall be issued a building permit for residential building defined as owner-occupied one- and two-family dwellings, including accessory garages, until that person or firm has been issued a residential contractor’s license required by this chapter.

Commentary: This gives the authority to exempt permits for work that is considered minor enough to not require inspections. It also references that any work that is contracted for an owner of an occupied one- and two-family dwelling is required to be permitted by a licensed residential contractor.

R105.2 Work exempt from permit. Permits shall not be required for the following. Exemption from 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 or any other laws or ordinances of this jurisdiction.

Building:

1. One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed 200 square feet (18.58 m²). A placement permit is required by the zoning ordinance.

2. Fences not over 7 feet (2134 mm) high. A fence permit is required by the zoning division.

3. Retaining walls that are not over 4 feet (1219 mm) in height measured from the bottom of the grade elevation footing to the top of the wall, unless supporting a surcharge.

4. Water tanks supported directly upon grade if the capacity does not exceed 5,000 gallons (18,927 L) and the ratio of height to diameter or width does not exceed 2 to 1.

5. Sidewalks and driveways. A driveway permit is required by the zoning division.

6. Painting, papering, tiling, carpeting, cabinets, counter-tops and similar finish work.

7. Prefabricated swimming pools that are less than 18 24 inches (457 610 mm) deep.

8. Swings and other playground equipment.

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.
10. Decks not exceeding 200 square feet (18.58 m²) in area, that are not more than 30 inches (762 mm) above grade at any point, are not attached to a dwelling and do not serve the exit door required by Section R311.4.

**Electrical:**


2. Reinstallation of attachment plug receptacles but not the outlets therefor.

3. Replacement of branch circuit overcurrent devices of the required capacity in the same location.

4. Electrical wiring, devices, *appliances*, apparatus, or *equipment* operating at less than 25 volts and not capable of supplying more than 50 watts of energy.

5. Minor repair work, including the replacement of lamps or the connection of approved portable electrical *equipment* to approved permanently installed receptacles.

**Gas:**

1. Portable heating, cooking or clothes drying *appliances*.

2. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.

3. Portable-fuel-cell *appliances* that are not connected to a fixed piping system and are not interconnected to a power grid.

**Mechanical:**

1. Portable heating *appliances*.

2. Portable ventilation *appliances*.

3. Portable cooling units.

4. Steam, hot- or chilled-water piping within any heating or cooling *equipment* regulated by this code.

5. Replacement of any minor part that does not alter approval of *equipment* or make such *equipment* unsafe.

6. Portable evaporative coolers.
7. Self-contained refrigeration systems containing 10 pounds (4.54 kg) or less of refrigerant or that are actuated by motors of 1 horsepower (746 W) or less.

8. Portable-fuel-cell appliances that are not connected to a fixed piping system and are not interconnected to a power grid.

The stopping of leaks in drains, water, soil, waste or vent pipe; provided, however, that if any concealed trap, drainpipe, water, soil, waste or vent pipe becomes defective and it becomes necessary to remove and replace the same with new material, such work shall be considered as new work and a permit shall be obtained and inspection made as provided in this code.

The clearing of stoppages or the repairing of leaks in pipes, valves, or fixtures, and the removal and reinstallation of water closets, provided such repairs do not involve or require the replacement or rearrangement of valves, pipes or fixtures.

Commentary: This section defines the types of work that do not require a building permit. Even though a building permit is not required for a shed less than 200 square feet, a zoning placement permit is nevertheless required; fences do not require a building permit, but there is a reference that a zoning permit is required; the height of a retaining wall that is exempt from permit issuance is clarified as the amount of grade that it supports, not from the bottom of the footing; the Zoning division requires permits for driveways; based on established ordinances for fence enclosures for pools, the exemption is 18 inches in water depth.

R106.1 Submittal documents. Submittal documents consisting of construction documents and other data shall be submitted in two or more sets with each application for a permit. The construction documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the building official is authorized to require additional construction documents to be prepared by a registered design professional.

Exception: The building official is authorized to waive the submission of construction documents and other data not required to be prepared by a registered design professional if it is found that the nature of the work applied for is such that reviewing of construction documents is not necessary to obtain compliance with this code.

Commentary: With reference to residential submittals, this is to require only a hard copy set of plans to accommodate the actual code review.

R106.1.4 Energy efficiency. Construction documents for detached one- and two-family dwellings and townhomes shall be provided with the intended R-value for the ceilings, walls, floors, basement walls (if finished), slab perimeter R-value and depth, and crawl space walls.

Commentary: This clarifies that new dwelling plans detail the minimum energy efficiency values for ceilings, walls, floors, basement walls.
**R106.1.5 Foundation reinforcement.** Construction for detached one- and two-family dwellings and town houses shall be provided with the intended reinforcement of foundation walls referenced in Tables R404.1.1(2), R404.1.1(3), and R404.1.1(4) for reinforced masonry foundation walls; Tables R404.1.2(2), R404.1.2(3), R404.1.2(4), and R404.1.1(8) for flat concrete foundation walls; Tables 404.1.2(5) and R404.1.2(6) for waffle-grid basement walls; and Table R404.1.2(7) for screed-grid basement walls where the foundation wall exceeds the provisions for plain masonry and concrete foundation walls.

*Commentary:* This requires that new dwelling plans detail the minimum size and spacing of reinforcement for foundation walls.

**R106.3.1 Approval of construction documents.** When the building official issues a permit, the construction documents shall be submitted and reviewed approved in writing or by a stamp which states “REVIEWED FOR CODE COMPLIANCE.” One set of construction documents so reviewed shall be retained by the building official. The other set shall be returned to the applicant, shall be kept at the site of work and shall be open to inspection by the building official or his or her authorized representative.

*Commentary:* Building Services does not require that a second copy of reviewed plans be returned to the permit holder.

**R108.2 Schedule of permit fees.** On buildings, structures, electrical, gas, mechanical and plumbing systems or alterations requiring a permit, a fee for each permit shall be paid as required in accordance with the schedule as established by the city applicable governing authority.

The fee for each residential building permit shall be set forth in Table 1-A, and other inspections and fees shall be in accordance with Table 1-C.

**Table No. 1-A.**
Residential Building Permit Fees Group R Division 3 (Including Congregate Residences Defined as R-3 and Accessory Group U Occupancies)

<table>
<thead>
<tr>
<th>Total Valuation</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 to $1,100</td>
<td>$20</td>
</tr>
<tr>
<td>$1,101 to $2,000</td>
<td>For valuations in excess of $1,100, $10 for the first $500, plus $1.50 for each additional $100 or fraction thereof, to and including $2,000</td>
</tr>
<tr>
<td>$2,001 to $25,000</td>
<td>$32.50 for the first $2,000, plus $6 for each additional $1,000 or fraction thereof, to and including $25,000</td>
</tr>
<tr>
<td>$25,001 to $50,000</td>
<td>$170.50 for the first $25,000, plus $4.50 for each additional $1,000 or fraction thereof, to and including $50,000</td>
</tr>
<tr>
<td>$50,001 to $100,000</td>
<td>$283 for the first $50,000, plus $3 for each additional $1,000 or fraction thereof, to and including $100,000</td>
</tr>
<tr>
<td>$100,001 and up</td>
<td>$433 for the first $100,000, plus $2.50 for each additional $1,000 or fraction thereof</td>
</tr>
</tbody>
</table>

**Table 1-C. Other Inspections and Fees**

1. Inspection outside of normal business hours, per hour*
   (minimum charge—one hour) .........................................................................................$70.00
2. Reinspection fees, per hour .............................................................................................$70.00
3. Inspections for which no fee is specifically indicated, per hour*
   (minimum charge—one-half hour) ...............................................................................$70.00
4. Additional plan review required by changes, additions, or revisions to approved plans, per hour* (minimum charge—one-half hour) .................................................$70.00
   *Or the total hourly cost to the jurisdiction, whichever is the greatest.
   This cost shall include supervision, overhead, equipment, hourly wages, and fringe benefits of the employees involved.
5. Wrecking permit fees ......................................................................................................$20.00
6. Swimming pool fence enclosures ...................................................................................$20.00
7. Residential reshingles .....................................................................................................$20.00
8. Residential resides ..........................................................................................................$20.00
9. Residential window replacements with no structural modifications (Group R and U occupancies) .........................................................................................................................$20.00
10. Board of appeals fees: Before any action is taken by the board, the party or parties requesting such hearing shall deposit with the secretary of the board, or his authorized agent, the sum of $65.00 to cover the approximate cost of the procedure. Under no condition shall said sum or any part thereof be refunded for failure of said request to be approved.
11. A mileage fee at the current rate per mile as established by the finance department shall be charged for any inspection occurring outside city limits.
12. Residential contractor’s license examination fee ......................................................................$75.00
13. Bond claims. An administrative fee shall be charged to cover the administrative cost of filing a claim .................................................................................................................$150.00
Commentary: This inserts those fees to cover the costs of the work expended by Building Services staff which includes plan review, inspections, administering permit issuance and department overhead. No fee increases are included for this code cycle.

**R108.6 Work commencing before permit issuance.** Any person who commences work requiring a *permit* on a building, structure, electrical, gas, mechanical or plumbing system before obtaining the necessary permits shall be subject to a fee established by the applicable governing authority that shall be in addition to the required *permit* fees. Administrative citations and legal and/or civil proceedings may also be commenced.

Commentary: This clarifies that work that is commenced without the issuance of a building permit can result in the issuance of administrative citations through the code enforcement process and which could include subsequent legal proceedings.

**R108.7 Delinquent accounts.** The administrative authority may refuse to issue permits or conduct inspections for any person or business whose account is delinquent.

Commentary: This clarifies that permits and inspections can be refused for a contractor whose accounts are delinquent with the City.

**R109.1.1 Foundation Footing inspection.** Inspection of the *footings foundation* shall be made after poles or piers are set or trenches or *basement* areas are excavated and any required forms erected and any required reinforcing steel is in place and supported prior to the placing of concrete. The *footing foundation* inspection shall include excavations for thickened slabs intended for the support of bearing walls, partitions, structural supports, or *equipment* and special requirements for wood foundations.

Commentary: The reference to foundation inspections is eliminated because inspections occur for the footings but do not occur prior to the pouring of foundation walls.

**R109.1.3 Floodplain inspections.** For construction in flood hazard areas as established by Appendix D, the Floodplain Management Ordinance Table R301.2(1), upon placement of the lowest floor, including *basement*, and prior to further vertical construction, the *floodplain administrator building official* shall require submission of documentation, prepared and sealed by a registered *design professional*, of the elevation of the lowest floor, including basement, required in Appendix D, the Floodplain Management Ordinance-Section R322.

Commentary: This is to clarify that floodplain provisions are found in the Floodplain Management Ordinance and not in the Residential Code.

**R109.1.6.1 Elevation documentation.** If located in a flood hazard area, the documentation of elevations required in Section R322.1.10 shall be submitted to the *floodplain administrator building official* prior to the final inspection.
Commentary: This is to clarify that elevation certificates are submitted to the Floodplain Administrator, not the Building Official.

R110.1 Use and occupancy. No building or structure shall be used or occupied, and no change in the existing occupancy classification of a building or structure or portion thereof shall be made until the building official has issued a certificate of occupancy therefor as provided herein and final inspections have been obtained from the electrical, mechanical, plumbing, and building inspection divisions of building services. An inspection placard shall be posted on the electrical panel, which is signed after final inspections have occurred by the electrical inspector, mechanical inspector, and plumbing inspector for new one- and two-family dwelling units and multiple single-family dwellings (town houses). Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the city jurisdiction. Certificates presuming to give authority to violate or cancel the provisions of this code or other ordinances of the city jurisdiction shall not be valid.

Exceptions:

1. Certificates of occupancy are not required for work exempt from permits under Section R105.2.

2. Accessory buildings or structures.

R110.6 Placards. Placards or inspection record tags placed on the job by the inspectors to indicate approval of the work inspected shall not be removed, except when authorized by the building official.

Commentary: These provisions clarify that occupancy in new dwellings is allowed to occur after final inspections from each respective division of Building Services. This directs the posting of a placard that is signed by each assigned inspector from each division of Building Services; i.e., building, plumbing, mechanical, and electrical. The signatures designate that life safety provisions have been confirmed from each respective division of Building Services.

R112.1 General. In order to hear and decide appeals of orders, decisions or determinations made by the building official relative to the application and interpretation of this code, to review all proposed changes to the respective codes and to submit recommendations to the responsible official and the city council, to review requests for house moves, to examine applicants for licensing, and to investigate matters brought before the board, there shall be and is hereby created a board of appeals and examiners. The building official shall be an ex officio member of said board but shall have no vote on any matter before the board. The board of appeals Members shall be appointed by the mayor with the consent of the council the governing body and shall hold office at its pleasure and shall hold office for a term of three years. The board shall adopt rules of procedure for conducting its business, and shall render all decisions and findings in writing to the appellant with a duplicate copy to the building and/or fire code official.
The board in exercising its authority over house moving may deny the building request or may require additional stipulations to be placed on the building permit to address the protection of the property values and neighborhood compatibility.

**Commentary:** Whereas the primary purpose of the Building Board of Appeals is to review interpretations of the Building and Fire Official, these modifications include the additional responsibilities of the Board which relates to review of ordinances, review residential house moves, and review of residential licensure. This also clarifies that the members are appointed by the Mayor with the advice and consent of the Council and that any findings are referred to the appellant in writing.

R112.2 Limitations on authority. An application for appeal shall be based on a claim that the true intent of this code or the rules legally adopted thereunder have been incorrectly interpreted, the provisions of this code do not fully apply, or an equally good or better form of construction is proposed. The board shall have no authority relative to the interpretation of the administrative provisions of this code nor shall the board be empowered to waive requirements of this code.

**Commentary:** This language was in the legacy codes but not included in the International Codes. The purpose of the Board is to review technical determinations by the Building and Fire Code Official, and not administrative provisions which defines the authority, establishes inspections, determines fees etc.

R113.3 Prosecution of violation. If the notice of violation is not complied with in the time prescribed by such notice, the building official is authorized to request the legal counsel of the jurisdiction to deem the violation as a strict liability offense and institute the appropriate proceeding at law or in equity to restrain, correct or abate such violation, or to require the removal or termination of the unlawful occupancy of the building or structure in violation of the provisions of this code or of the order or direction made pursuant thereto.

Section R202. Definitions. Add the following definition.

**Strict liability offense.** An offense in which the prosecution in a legal proceeding is not required to prove criminal intent as a part of its case. It is enough to prove that the defendant either did an act which was prohibited or failed to do an act which the defendant was legally required to do.

**Commentary:** Strict liability offense is inserted to clarify that it is applicable to any violation of a residential building code provision. This term brings the code in line with the current legal terminology used in other codes with regard to the prosecution of violations. With this term the prosecutor is not required to prove that code violations were intended by a defendant or were even due to negligence. It is difficult to prove such intentions or negligence in a court of law. This provision is located only in the Property Maintenance Code at the national level but is inserted into all of the adopted Building Services codes locally.
<table>
<thead>
<tr>
<th>Table R301.2(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climatic and Geographic Design Criteria</td>
</tr>
</tbody>
</table>

1. **GROUND SNOW LOAD** \(^1\) ........................................... 40 psf contour

**WIND DESIGN**

2. Wind Speed \(^d\) ................................................................. 90 mph

3. Topographic Effects \(^k\) ......................................................... No

4. **SEISMIC DESIGN CATEGORY** \(^f\) ....................................... A

**SUBJECT TO DAMAGE FROM**

5. Weathering \(^a\) ....................................................................... Severe

6. Frost Line Depth \(^b\) ......................................................... 42 inches (1,067 mm)

7. Termite Damage \(^c\) ............................................................. Slight to Moderate

8. WINTER DESIGN TEMPERATURE \(^e\) ...................................... -11 degrees Fahrenheit

9. ICE BARRIER UNDERLAYMENT REQUIREMENT \(^h\) .................. Yes

10. FLOOD HAZARDS \(^g\) Sioux Falls entered the regular phase of the National Flood Insurance Program on September 17, 1979.

11. AIR FREEZING INDEX \(^i\) ...................................................... 3,000

12. MEAN ANNUAL TEMPERATURE \(^j\) ........................................... 46 degrees Fahrenheit

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

**Notes:**

- **a.** Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index (i.e., “negligible,” “moderate” or “severe”) for concrete as determined from the Weathering Probability Map [Figure R301.2(3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.

- **b.** The frost line depth may require deeper footings than indicated in Figure R403.1(1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

- **c.** The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

- **d.** The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(4)A]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.
e. The outdoor design dry-bulb temperature shall be selected from the columns of 97 1/2 percent values for winter from Appendix D of the *International Plumbing Code*. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.

f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.

g. The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction’s entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of all currently effective FIRMs and FBFMs or other flood hazard map adopted by the authority having jurisdiction, as amended.

h. In accordance with Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall fill in this part of the table with “NO.”

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table “Air Freezing Index-USA Method (Base 32°F)” at [www.ncdc.noaa.gov/fpsf.html](http://www.ncdc.noaa.gov/fpsf.html).

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table “Air Freezing Index- USA Method (Base 32°F)” at [www.ncdc.noaa.gov/fpsf.html](http://www.ncdc.noaa.gov/fpsf.html).

k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with “YES.” Otherwise, the jurisdiction shall indicate “NO” in this part of the table.

l. On roof systems that are not engineered, conventionally framed roof slopes with a rise of 3 inches (76.2 mm) or less to 12 inches (305 mm) shall be designed for a full or unbalanced snow load of not less than 30 pounds per square foot (1.44 kN/square meter) of horizontal projection. Where a roof system is designed to slope less than 1/4 inch (6.35 mm) per 12 inches (305 mm), a surcharge load of not less than 5 pounds per square foot (0.24 kN/square meter) in addition to the required live load due to snow shall be designed for. Roof slopes with over 3 inches (76.2 mm) of rise per 12 inches (305 mm) shall be designed for a full or unbalanced snow load of not less than 25 pounds per square foot (1.2 kN/square meter) of horizontal projection. Potential unbalanced accumulation of snow at valleys, parapets, roof structures, and offsets in roofs of uneven configuration shall be considered.

**Commentary:** Table R301.2(1) defines the minimum geographic design criteria for residential building construction. The footnotes give directions for a local jurisdiction to reference for such loading requirements such as minimum live loads due to snow, wind speed for lateral force capability, seismic zone location, etc. Footnote l carries over a local amendment that defines a specific snow load which approximates the ground snow criteria and is used for span tables for rafters, which are made available to residential contractors locally.
<table>
<thead>
<tr>
<th>USE</th>
<th>LIVE LOAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uninhabitable attics without storage b</td>
<td>10</td>
</tr>
<tr>
<td>Uninhabitable attics with limited storage b, g</td>
<td>20</td>
</tr>
<tr>
<td>Habitable attics and attics served with fixed stairs</td>
<td>30</td>
</tr>
<tr>
<td>Balconies (exterior) and decks e</td>
<td>40</td>
</tr>
<tr>
<td>Fire escapes</td>
<td>40</td>
</tr>
<tr>
<td>Guardrails and handrails d</td>
<td>200^b</td>
</tr>
<tr>
<td>Guardrails in-fill components f</td>
<td>50^b</td>
</tr>
<tr>
<td>Passenger vehicle garages a</td>
<td>50^n</td>
</tr>
<tr>
<td>Rooms other than sleeping rooms</td>
<td>40</td>
</tr>
<tr>
<td>Sleeping rooms</td>
<td>20</td>
</tr>
<tr>
<td>Stairs</td>
<td>40^f</td>
</tr>
</tbody>
</table>

For SI: 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm², 1 pound = 4.45 N.

a. Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.

b. Uninhabitable attics without storage are those where the maximum clear height between joists and rafters is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches high by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

d. A single concentrated load applied in any direction at any point along the top.

e. See Section R502.2.2 for decks attached to exterior walls.

f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g. Uninhabitable attics with limited storage are those where the maximum clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches.

2. The slopes of the joists or truss bottom chords are no greater than 2 inches vertical to 12 units horizontal.
3. Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 lb/ft².

h. Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the infill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

Commentary: This table defines the minimum loads based on the use of a particular area or portion of the structure that must be considered for the design of the corresponding structural element for a residence. The table is consistent with ASCE 7 and the IBC. The local amendment maintains the same live load in a bedroom as any other portion of the house consistent with the previous legacy code.

TABLE R302.1(1)
EXTERIOR WALLS

<table>
<thead>
<tr>
<th>Exterior Wall Element</th>
<th>Minimum Fire-Resistance Rating</th>
<th>Minimum Fire Separation Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td>Fire-resistance rated</td>
<td>1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from both sides</td>
</tr>
<tr>
<td></td>
<td>Not fire-resistance rated</td>
<td>0 hours</td>
</tr>
<tr>
<td>Projections</td>
<td>Fire-resistance rated</td>
<td>1 hour on the underside</td>
</tr>
<tr>
<td></td>
<td>Not fire-resistance rated</td>
<td>0 hours</td>
</tr>
<tr>
<td>Openings</td>
<td>Not allowed</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>25% Maximum of Wall Area</td>
<td>0 hours</td>
</tr>
<tr>
<td></td>
<td>Unlimited</td>
<td>0 hours</td>
</tr>
<tr>
<td>Penetrations</td>
<td>All</td>
<td>Comply with Section R317.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>None required</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable.

Commentary: This relaxes the mandate to install gypsum sheathing on the underside of a projecting element such as a roof overhang that is closer than 5 feet to a property line. The amendment would require a fire resistive membrane where a projecting element is closer than 3 feet to a property line consistent with previous legacy codes and previous editions of the I-Codes.

R302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance-rated wall assemblies meeting the requirements of Section R302.1 for exterior walls.
Exception: A common 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E 119 or UL 263 is permitted for town houses provided with an automatic fire-extinguishing system designed and installed in accordance with NFPA 13-D, or equivalent, if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. Electrical installations shall be installed in accordance with the electrical code Chapters 34 through 43. Penetrations of electrical outlet boxes shall be in accordance with Section R302.4.

Commentary: This reduces the required fire resistivity of a common wall between townhouse units from two hours to one hour, but is based upon the national model code that mandates sprinklers for all townhouses. The local amendment recognizes that a reduced fire resistivity is acceptable if there is a sprinkler system installed, which is not a local code mandate but an option of the owner.

R302.2.1 Continuity. The fire-resistance-rated wall or assembly separating townhouses shall be continuous from the foundation to the underside of the roof sheathing, deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures.

Exterior walls that extend beyond an adjacent structure that has a fire separation distance less than 5 feet (1,523 mm) to a common property line shall have not less than a one-hour fire rating with exposure from both sides with no openings allowed therein.

Projections such as a deck that have a fire separation distance of less than 3 feet (914 mm) to a common property line shall have a 1-hour fire rating with exposure from both sides with no openings allowed therein that extends at least 30 inches (762 mm) above the projection.

Commentary: This is intended to clarify that when one side of a town house extends past a common wall between units, the extended wall and/or projecting element is required to be of a fire-resistive construction consistent with location on property provisions.

R303.4 Mechanical ventilation. Where the air infiltration rate of a dwelling unit is less than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. (50 Pa) in accordance with Section N1102.4.1.2, the dwelling unit shall be provided with whole-house mechanical ventilation in accordance with Section M1507.3.

Exception. Where the air infiltration rate of a dwelling unit is greater than 5 air changes per hour when tested with a blower door at a pressure of 0.2 inch w.c. (50 Pa) in accordance with Section N1102.4.1.2, whole-house mechanical ventilation in accordance with Section M1507.3 is not required.

Commentary: Section N1102.4.1.2 is a new national mandate of the IRC to require blower door tests on every new dwelling. This provision specifies that when the blower door test determines an air infiltration rate of less than 5 air changes per hour, whole house ventilation is required. Discussions with the HBA agree that there is no need to incur the cost of a blower door test to determine that today’s dwellings have an air infiltration rate of less than 5 air changes per hour. As dwelling
envelopes become more air-tight, there is evidence that indoor contaminant levels are rising. Poor indoor air quality, the inability to rely on openable windows for natural ventilation with South Dakota's winters, and decreasing rates of air-infiltration have led the code to require mechanical ventilation consisting of bringing in outside air and exhausting inside air in dwellings. Several states, including Minnesota, have mandated mechanical whole house ventilation in dwellings for years. This provision is modified locally to say that whole house ventilation is not required if a builder chooses to prove by means of a blower door test that the dwelling exceeds an air infiltration rate of greater than 5 air changes per hour, which by today’s building practices is a very high rate of infiltration.

R303.5.1 Intake openings. Mechanical and gravity outdoor air intake openings shall be located a minimum of 10 feet (3048 mm) from any hazardous or noxious contaminant, such as vents, chimneys, plumbing vents, streets, alleys, parking lots and loading docks, except as otherwise specified in this code. Where a source of contaminant is located within 10 feet (3048 mm) of an intake opening, such opening shall be located a minimum of 3 feet (914 mm) below the contaminant source. For the purpose of this section, the exhaust from dwelling unit toilet rooms, bathrooms and kitchens shall not be considered as hazardous or noxious.

**Exception:** For equipment replacements on existing structures, gravity outdoor intake openings for combustion air shall be located a minimum of 3 feet from any hazardous or noxious contaminant.

*Commentary:* The 10-foot distance is reduced to 3 feet in existing conditions because of the impracticality of existing space limitations.

R309.5 Fire sprinklers. Not adopted by the city. Private garages shall be protected by fire sprinklers where the garage wall has been designed based on Table R302.1(2), Footnote a. Sprinklers in garages shall be connected to an automatic sprinkler system that complies with Section P2904. Garage sprinklers shall be residential sprinklers or quick-response sprinklers, designed to provide a density of 0.05 gpm/ft². Garage doors shall not be considered obstructions with respect to sprinkler placement.

*Commentary:* This new section adds provisions to permit non-fire-rated exterior walls and projections for garages with zero clearance to a lot line subject to mandating that the garage be provided with an automatic fire-extinguishing system. The provision is eliminated locally based on state law that does not allow a county or a municipality to require an automatic fire-extinguishing system in one- and two-family dwelling, townhouse, and their accessory structures.

R310.1 Emergency escape and rescue required. Basements, habitable attics and every sleeping room shall have at least one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, emergency egress and rescue openings shall be required in each sleeping room. Where emergency escape and rescue openings are provided they shall have a sill height of not more than 48 44 inches (1220 1118 mm) measured from the finished floor to the bottom of the clear opening. Where a door opening having a threshold below the adjacent ground elevation serves as an emergency escape and rescue opening and is provided with a bulkhead enclosure, the bulkhead enclosure shall comply with Section R310.3. The net clear opening dimensions required by this section shall be obtained by the normal operation of the
emergency escape and rescue opening from the inside. Emergency escape and rescue openings with a finished sill height below the adjacent ground elevation shall be provided with a window well in accordance with Section R310.2. Emergency escape and rescue openings shall open directly into a public way or to a yard or court that opens to a public way.

**Exception:** Basements used only to house mechanical equipment and not exceeding total floor area of 200 square feet (18.58 m²).

**R310.1.1 Minimum opening area.** All emergency escape and rescue openings shall have a minimum net clear opening of 5.0 5.7 square feet (0.465 0.530 m²).

**Exception:** Grade floor openings shall have a minimum net clear opening of 5 square feet (0.465 m²).

**R310.2.1 Ladder and steps.** Window wells with a vertical depth greater than 48 44 inches (1220 1118 mm) shall be equipped with a permanently affixed ladder or steps usable with the window in the fully open position. Ladders or steps required by this section shall not be required to comply with Sections R311.7 and R311.8. Ladders or rungs shall have an inside width of at least 12 inches (305 mm), shall project at least 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center vertically for the full height of the window well.

**Commentary:** These provisions maintain local modifications to allow sill heights of windows and the height of a window well where a ladder is required to be increased from 44 inches to 48 inches. Also, instead of having two standards for the openable area of an egress window, a 5-square-foot clear openable area is deemed acceptable locally.

**R311.3.1 Floor elevations at the required egress doors.** Landings or finished floors at the required egress door shall not be more than 1 1/2 inches (38 mm) lower than the top of the threshold.

**Exception:** The landing or floor on the exterior side shall not be more than 8 7 3/4 inches (202 196 mm) below the top of the threshold provided the door does not swing over the landing or floor.

Where exterior landings or floors serving the required egress door are not at grade, they shall be provided with access to grade by means of a ramp in accordance with Section R311.8 or a stairway in accordance with Section R311.7.

**R311.3.2 Floor elevations for other exterior doors.** Doors other than the required egress door shall be provided with landings or floors not more than 8 7 3/4 inches (202 196 mm) below the top of the threshold.

**Exception:** A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.
R311.7.5.1 Risers. The maximum riser height shall be 8 7 3/4 inches (202 496 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the opening between treads does not permit the passage of a 4-inch-diameter (102 mm) sphere.

Exception: The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

Commentary: These provisions maintain the maximum 8-inch riser for a step at a landing or stair. This riser height was changed to a maximum height of 7 3/4 inches with the first edition of the I-Codes, but has been reverted to an 8-inch which had been the standard for riser heights for years from the previous legacy codes.

R311.7.8.2 Continuity. Handrails for stairways shall be continuous from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1 1/2 inch (38 mm) between the wall and the handrails.

Exceptions:

1. Handrails shall be permitted to be interrupted by a newel post at the turn.

2. The use of a volute, turnout, starting easing or starting newel shall be allowed over the lowest tread.

R311.7.8.3 Grip-size. All required handrails shall be of one of the following types or provide equivalent graspability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of at least 1 1/4 inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter dimension of at least 4 inches (102 mm) and not greater than 6 1/4 inches (160 mm) with a maximum cross section of dimension of 2 1/4 inches (57 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).

2. Type II. Handrails with a perimeter greater than 6 1/4 inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4 inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch (8 mm) within 7/8 inch (22 mm) below the widest portion of the profile. This required depth shall continue for at least 3/8 inch (10 mm) to a level that is not less than 1 3/4 inches (45 mm) below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1 1/4 inches (32 mm) to a maximum of 2 3/4 inches (70 mm). Edges shall have a minimum radius of 0.01 inch (0.25 mm).
**Exception:** Exterior stairs are allowed to have a horizontal 2X member to form a 1 1/2-inch graspable dimension in lieu of the above-referenced perimeter dimensions.

Commentary: This maintains the requirement for a handrail on one side of a stair, but does not require a continuous handrail to provide flexibility for an offset handrail that may terminate at a floor/wall intersection. The exception recognizes that a flat or horizontal 2X member on an exterior deck provides an adequate gripping surface.

**R312.1.3 Opening limitations.** Required guards shall not have openings from the walking surface to the required guard height which allow passage of a sphere 5 4 inches (127 102 mm) in diameter.

**Exceptions:**

1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches (153 mm) in diameter.

2. Guards on the open side of stairs shall not have openings which allow passage of a sphere 43/8 inches (111 mm) in diameter.

Commentary: This maintains a 5-inch spacing between intermediates on an open handrail or guardrail instead of the more restrictive 4-inch spacing that dates back to legacy code criteria.

**R312.2.1 Window sills.** In dwelling units, where the opening of an operable window is located more than 72 inches (1829 mm) above the finished grade or surface below, the lowest part of the clear opening of the window shall be a minimum of 18 24 inches (457 610 mm) above the finished floor of the room in which the window is located. Operable sections of windows shall not permit openings that allow passage of a 4-inch-diameter (102 mm) sphere where such openings are located within 18 24 inches (457 640 mm) of the finished floor.

**Exceptions:**

1. Windows whose openings will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening when the opening is in its largest opened position.

2. Openings that are provided with window fall prevention devices that comply with ASTM F 2090.

3. Windows that are provided with window opening control devices that comply with Section R312.2.2.

Commentary: This decreases the threshold from a sill height of 24 inches to a sill height of 18 inches for an openable window that is required to have a reduced opening width to prevent children from falling from an elevated window that is located more than 6 feet above an exterior grade.
R313.1 Townhouse automatic fire sprinkler systems. **Not adopted by the city.** An automatic residential fire sprinkler system shall be installed in townhouses.

**Exception:** An automatic residential fire sprinkler system shall not be required when additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.

R313.1.1 Design and installation. When an automatic residential fire sprinkler system for townhouses are installed, it shall be designed and installed in accordance with Section P2904.

R313.2 One- and two-family dwellings automatic fire systems. **Not adopted by the city.** An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.

**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential sprinkler system.

R313.2.1 Design and installation. When an automatic residential fire sprinkler systems are installed, it shall be designed and installed in accordance with Section P2904 or NFPA 13D.

Commentary: These provisions have been deleted because South Dakota state law does not allow a county or municipality to mandate automatic fire extinguishers in townhouses or one- and two-family dwellings and their accessory structures. The provisions that define the standard for residential automatic fire-extinguishing systems, a minimum NFPA-13D or equivalent, is specified for a building owner that chooses to install a residential sprinkler system.

R314.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.

2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

3. On each additional **story** of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full **story** below the upper level.

4. Where the ceiling height of a room is open to the hallway serving a bedroom exceeds that of the hallway by 24 inches (610 mm) or more, smoke detectors shall be installed in the hallway and in the adjacent room.

**Exception.** Hallways less than 4 feet (1,220 mm) in length are allowed to omit the smoke detector within the hallway adjacent to the bedrooms.
Commentary: This maintains a legacy code requirement to provide the protection of an earlier smoke detector activation on a cathedral or vaulted ceiling located adjacent to bedrooms or a hallway serving bedrooms.

**R314.3.1 Alterations, repairs and additions.** When alterations, repairs or additions requiring a permit occur with a valuation of more than $1000, or when one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings.

**Exceptions:**

1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck, are exempt from the requirements of this section.

2. Installation, alteration or repairs of plumbing or mechanical systems are exempt from the requirements of this section.

Commentary: This maintains a legacy code requirement of a $1000 threshold to not require the installation of smoke detectors for small interior projects.

**R314.4 Power source.** Smoke alarms shall receive their primary power from the building wiring when such wiring is served from a commercial source, and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

**Exceptions:**

1. Smoke alarms shall be permitted to be battery-operated when installed in buildings without commercial power.

2. Hard wiring of smoke alarms in existing areas shall not be required where the alterations or repairs do not result in the removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available which could provide access for hard wiring without the removal of interior finishes.

Commentary: This allows battery-activated smoke detector to be installed on interior renovations for those projects where the interconnection of a hard-wired system is not practical.

**R315.3 Where required in existing dwellings.** Not adopted by the city. Where work requiring a permit occurs in existing dwellings that have attached garages or in existing dwellings within which fuel fired appliances exist, carbon monoxide alarms shall be provided in accordance with Section R315.1.
Commentary: This eliminates the requirement for the installation of CO detectors where there is any work on an existing dwelling that requires a building permit. This language is not enforceable especially for a permit issued for exterior modifications where the inspector has no expectation to complete an interior inspection.

R317.1 Location required. Protection of wood and wood-based products from decay shall be provided in the following locations by the use of naturally durable wood or wood that is preservative-treated in accordance with AWPA U1 for the species, product, preservative and end use. Preservatives shall be listed in Section 4 of AWPA U1.

1. Wood joists or the bottom of a wood structural floor when closer than 18 inches (457 mm) or wood girders when closer than 12 inches (305 mm) to the exposed ground in crawl spaces or unexcavated area located within the periphery of the building foundation.

2. All wood framing members that rest on concrete or masonry exterior foundation walls and are less than 6 8 inches (152 203 mm) from the exposed ground.

3. Sills and sleepers supporting bearing walls on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.

4. The ends of wood girders entering exterior masonry or concrete walls having clearances of less than 1/2 inch (12.7 mm) on tops, sides and ends.

5. Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs, and similar horizontal surfaces exposed to the weather.

6. Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.

7. Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below grade except where an approved vapor retarder is applied between the wall and the furring strips or framing members.

Commentary: This maintains the legacy standard for sill plates to be pressure treated for a 6-inch instead of an 8-inch wood to earth separation. Additionally, because basement sill plates are not subject to water splash, treated plates are required only on bearing walls where there is not a moisture barrier provided below the slab.

R319.1 Address numbers. New and existing buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters.
Numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure. **Multi-building campus/complex developments addressed on private or public streets shall be provided with signage at the entrance to the campus/complex indicative of the address ranges within.**

**Commentary:** To accommodate fire and emergency response, additional directional signage at the entrance of a complex is required.

**R403.1.4.1 Frost protection.** Except where otherwise protected from frost, foundation walls, piers and other permanent supports of buildings and structures shall be protected from frost by one or more of the following methods:

1. Extended below the frost line specified in Table R301.2.(1);
2. Constructing in accordance with Section R403.3;
3. Constructing in accordance with ASCE 32; or
4. Erected on solid rock.

**Exceptions:**

1. Protection of freestanding accessory structures with an area of **1500** square feet (**139 56** m²) or less of light-frame construction, with an eave height of 10 feet (3048 mm) or less shall not be required.
2. Protection of freestanding accessory structures with an area of 400 square feet (37 m²) or less, of other than light-frame construction, with an eave height of 10 feet (3048 mm) or less shall not be required.
3. Decks not supported by a dwelling need not be provided with footings that extend below the frost line.

Footings shall not bear on frozen soil unless the frozen condition is permanent.

**Commentary:** This increases the allowable area of a non-occupied building from 600 to 1500 square feet before there is a requirement for the footings and foundations to be frost protected. This would allow up to a 5-stall garage to be located on a floating slab.

**R404.4 Retaining walls.** Retaining walls that are not laterally supported at the top and that retain in excess of 48 24 inches (**1 220 640** mm) of unbalanced fill shall be designed to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning.
Commentary: Permits are not required for retaining walls less than 48 inches in height; therefore, the reference to stability is increased from 24 inches to 48 inches.

R501.3 Fire protection of floors. Not adopted by the city. Floor assemblies, not required elsewhere in this code to be fire resistance rated, shall be provided with a 1/2-inch (12.7 mm) gypsum wallboard membrane, 5/8-inch (16 mm) wood structural panel membrane, or equivalent on the underside of the floor framing member.

Exceptions: 1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA13D, or other approved equivalent sprinkler system.
2. Floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances.
3. Portions of floor assemblies can be unprotected when complying with the following:
   3.1. The aggregate area of the unprotected portions shall not exceed 80 square feet per story
   3.2. Fire blocking in accordance with Section R302.11.1 shall be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or structural composite lumber equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other approved floor assemblies demonstrating equivalent fire performance.

Commentary: This new national provision requires all floor assemblies consisting of light frame construction to be protected on the underside has been eliminated locally. This would require a homeowner who chooses to finish a basement at a later date to remove the covering to accommodate ductwork and electrical and plumbing systems.

R502.3.1 Sleeping areas and attic joists. Table R502.3.1(1) shall be used to determine the maximum allowable span of floor joists that support sleeping areas and attics that are accessed by means of a fixed stairway in accordance with Section R311.7, provided that the design live load does not exceed 40 pounds per square foot (1.92 kPa) and the design dead load does not exceed 20 pounds per square foot (0.96 kPa). The allowable span of ceiling joists that support attics used for limited storage or no storage shall be determined in accordance with Section R802.4.

Commentary: The referenced live load of a bedroom floor is changed from 30 to 40 psf to be consistent with the change that was made to Table R301.5, Minimum Uniformly Distributed Live Load.

R602.10.1.2 Offsets along a braced wall line. All exterior walls parallel to a braced wall line shall be offset not more than 4 feet (1219 mm) from the designated braced wall line location as
is shown on Figure R602.10.1.1. Interior walls used as bracing shall be offset not more than 4 feet (1219 mm) from a braced wall line through the interior of the building as shown in Figure R602.10.1.1.

**Exception:** The offset out-of-plane may exceed 4 feet (1219 mm) and the out-to-out offset dimension may exceed 8 feet (2438 mm) if the area of the offset is less than 200 square feet.

**Commentary:** This maintains the capability to build a relatively small addition without structural engineered analysis or conventional wind bracing capability.

**R602.12 Simplified wall bracing.** Buildings meeting all of the conditions listed in Items 1–8 shall be permitted to be braced in accordance with this section as an alternative to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified herein, shall not be permitted.

1. There shall be no more than two stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.

2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.

3. Wall height shall not be greater than 40 1/2 feet (1292 2743 mm).

4. The building shall have a roof eave-to-ridge height of 20 1/2 feet (6096 4572 mm) or less.

5. All exterior walls shall have gypsum board with a minimum thickness of 1/2 inch (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.

6. The structure shall be located where the basic wind speed is less than or equal to 90 mph (40 m/s), and the Exposure Category is A, or B or C.

7. The structure shall be located in Seismic Design Category A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for town houses.

8. Cripple walls shall not be permitted in two-story buildings.

**R602.12.1 Circumscribed rectangle.** The bracing required for each building shall be determined by circumscribing a rectangle around the entire building on each floor as shown in Figure R602.12.1. The rectangle shall surround all enclosed offsets and projections such as sunrooms and attached garages. Open structures, such as carports and decks, shall be permitted to be excluded. The rectangle shall have no side greater than 80 60 feet (24,384 18,288 mm), and the ratio between the long side and short side shall be a maximum of 3:1.
### TABLE R602.12.4

**MINIMUM NUMBER OF BRACING UNITS ON EACH SIDE OF THE CIRCUMSCRIBED RECTANGLE**

<table>
<thead>
<tr>
<th>STORY LEVEL</th>
<th>EAVE-TO-RIDGE HEIGHT (feet)</th>
<th>MINIMUM NUMBER OF BRACING UNITS ON EACH LONG SIDE</th>
<th>MINIMUM NUMBER OF BRACING UNITS ON EACH SHORT SIDE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Length of short side (feet)</td>
<td>Length of long side (feet)</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>20 30 40 50 60 70 80</td>
<td>10 20 30 40 50 60 70 80</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1 2 2 2 3 3 4 4</td>
<td>1 2 2 2 3 3 4 4</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>2 3 3 4 5 6 6 7</td>
<td>2 3 3 4 5 6 6 7</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Interpolation shall not be permitted.

b. Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as the first floor of a two-story house.

c. Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.

**R602.12.3 Bracing unit.** A bracing unit shall be a full height sheathed segment of the exterior wall with no openings or vertical or horizontal offsets and a minimum length as specified herein for intermittent sheathing. **Bracing units shall be considered per story for continuously sheathed structural wood panels.** Interior walls shall not contribute toward the amount of required bracing. Mixing of Items 1 and 2 is prohibited on the same story.

1. Where all framed portions of all exterior walls are sheathed in accordance with Section R602.12.2, including wall areas between bracing units, above and below openings and on gable end walls, the minimum length of a bracing unit shall be 3 feet (914 mm).

2. Where the exterior walls are braced with sheathing panels in accordance with Section R602.12.2 and areas between bracing units are covered with other materials, the minimum length of a bracing unit shall be 4 feet (1219 mm).

**Commentary:** Section R602 provides for a simplified prescriptive procedure for bracing wall lines for houses. **This simplified set of rules avoids the complexity of changes made to braced wall panels and wall lines that was introduced into the 2009 IRC and remains in the 2012 IRC.** Whereas the 2012 IRC limits this application of wind analysis to Exposure C gust factors and maximum 60-foot length houses, by local modification the simplified wind analysis has been expanded to houses built on the outskirts of the city or an Exposure C gust factor and the tables have been expanded to an 80-foot maximum width.

When these requirements are met, the simplified method determines required wall bracing based on a circumscribed rectangle drawn around the exterior of the building. The intent of the ratio of the length...
to width is based on 3:1 or less. Long narrow buildings commonly are not intended to take advantage of this simplified criteria.

This is applicable to the exterior walls being continuously sheathed with wood structural panels (WSP). If there is insufficient full height wall length per story (again a local modification) along one or more exterior wall lines, conventional wind bracing per Section R602.10 must be utilized, or there must be submitted a structural engineered analysis.

Based on the wall lines being continuously sheathed, the minimum braced wall length is 3 feet. When the bracing units are intermittent with other materials along the braced wall line, the minimum bracing unit length is 4 feet. If the bracing units are longer than the minimum, they may be considered as multiple units for the purpose of counting bracing units.

Table R602.12.4 lists the required number of bracing units for each side of the building based on the perpendicular side length of the circumscribed rectangle and the eave-to-ridge height. Once the rectangle is drawn around the building on a plan, all side lengths used to determine the required amount of bracing are taken from the circumscribed rectangle, as shown in the figure addressing maximum side length.

Bracing units located along the wall lines must meet the following requirements:

- The first bracing unit on the wall line must begin within 12 feet of the corner.
- The maximum distance between the edges of two bracing units is 20 feet.
- Wall segments longer than 8 feet must have at least one bracing unit.

R802.11.1 Uplift resistance. Roof assemblies shall be connected to wall plate by the use of approved connectors, consisting of truss/rafter to wall connector, having a resistance to uplift of not less than 175 pounds installed in accordance with the manufacturer’s specifications or have uplift resistance in accordance with Sections R802.11.1.2 and R802.11.1.3.

Where the uplift force does not exceed 200 pounds, rafters and trusses spaced not more than 24 inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Where the basic wind speed does not exceed 90 mph, the wind exposure category is B, the roof pitch is 5:12 or greater, and the roof span is 32 feet (9754 mm) or less, rafters and trusses spaced not more than 24 inches (610 mm) on center shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1).

Commentary: Previous editions of the IRC simply referenced a connector for 175 pounds to be installed on all trusses and rafter subject to wind uplift. The local amendment maintains the standard that all trusses have uplift connectors, but allows as an alternate the new provisions for roof connections to resist wind uplift force, which have been updated to current engineering standards. Table 802.11 has been replaced to provide accurate values for both low- and high-sloped roofs in both wind gust factors B and C.
N1101.3 (R101.4.3) Additions, alterations, renovations or repairs. Additions, alterations, renovations, or repairs to an existing building, building system or portion thereof may shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion(s) of the existing building or building system to comply with this code. Additions, alterations, renovations or repairs shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building.

Exception: The following need not comply provided the energy use of the building is not increased:

1. Storm windows installed over existing fenestration.
2. Glass only replacements in an existing sash and frame.
3. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are filled with insulation.
4. Construction where the existing roof, wall or floor cavity is not exposed.
5. Reroofing for roofs where neither the sheathing nor the insulation is exposed. Roofs without insulation in the cavity and where the sheathing or insulation is exposed during reroofing shall be insulated either above or below the sheathing.
6. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided, however, that an existing vestibule that separates a conditioned space from the exterior shall not be removed.
7. Alterations that replace less than 50 percent of the luminaires in a space, provided that such alterations do not increase the installed interior lighting power.
8. Alterations that replace only the bulb and ballast within the existing luminaires in a space provided that the alteration does not increase the installed interior lighting power.

Commentary: This provision mandates that any additions, alterations, or repairs comply with the same energy efficiency standards as is required for new construction, but goes on to clarify certain building elements that are exempted, which was not required in previous residential codes. The amendment takes away the mandatory language to provide an option in those cases when it is not practical to maintain more stringent requirements onto existing construction.
### TABLE N1102.1.1 (R402.1.1)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>

<table>
<thead>
<tr>
<th>CLIMATE ZONE</th>
<th>FENESTRATION U-FACTOR&lt;sup&gt;b&lt;/sup&gt;</th>
<th>SKYLIGHT&lt;sup&gt;d&lt;/sup&gt; U-FACTOR</th>
<th>GLAZED FENESTRATION SHGC&lt;sup&gt;e&lt;/sup&gt;</th>
<th>CEILING R-VALUE</th>
<th>WOOD FRAME WALL R-VALUE</th>
<th>MASS WALL R-VALUE</th>
<th>FLOOR R-VALUE</th>
<th>BASEMENT&lt;sup&gt;c&lt;/sup&gt; WALL R-VALUE</th>
<th>SLAB&lt;sup&gt;f&lt;/sup&gt; R-VALUE</th>
<th>CRAWL SPACE&lt;sup&gt;c&lt;/sup&gt; WALL R-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.32</td>
<td>0.55</td>
<td>NR</td>
<td>49</td>
<td>20 or 13 + 5</td>
<td>15/19</td>
<td>30</td>
<td>10/13</td>
<td>10.4 ft</td>
<td>10/13</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

#### a. R-values are minimums. U-factors and SHGC are maximums. When insulation is installed in a cavity is less than the label or design thickness of the insulation, the installed R-value of the insulation shall not be less than the R-value specified in the table.

#### b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

**Exception:** Skylights may be excluded from glazed fenestration SHGC requirements in Climate Zones 1 through 3 where the SHGC for such skylights does not exceed 0.30.

#### c. “15/19” means R-15 continuous insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. “15/19” shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulation on the interior or exterior of the home. “10/13” means R-10 continuous insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall. The perimeter wall of an enclosed mechanical room is allowed to not be a component of the thermal envelope.

#### d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.

#### e. There are no SHGC requirements in the Marine Zone.

#### f. Basement wall insulation is not required in warm humid locations as defined by Figure N1101.10 and Table N1101.10.

#### g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

#### h. First value is cavity insulation, second is continuous insulation or insulated siding, so “13 + 5” means R-13 cavity insulation plus R-5 continuous insulation or insulated siding. If structural sheathing covers 40 percent or less of the exterior, continuous insulation R-value shall be permitted to be reduced by no more than R-3 in the locations where structural sheathing is used—to maintain a consistent total sheathing thickness.

#### i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

#### j. The minimum R-value for ceilings is further based on a minimum 6-inch (152 mm) heel height to allow the ceiling insulation to extend over the top plate.

**Commentary:** Table N1102.1.1 (R402.1.1) requires the jurisdiction to insert those thermal envelope elements that are applicable to the Climate Zone that the jurisdiction is located. The changes to the prescriptive energy requirements that are found in Climate Zone 6 are:

- Fenestration is reduced from 0.35 to 0.32.
- Skylight U-Factors are reduced from 0.60 to 0.55.
- Ceiling R-value remains the same.
- Walls are increased from an R-20/13+5 to an R20+5/13+10, and it was the consensus of the HBA to maintain the status quo of a wall R-Value of the entire wall assembly to remain at 20.
- Basements and Crawl spaces are increased from a continuous R10 or cavity R13 to a continuous R-15 or cavity R-19. Again, it was the consensus of the HBA to maintain the existing basement wall value at an R 10/13.

N1102.2.8 (R402.2.8) Basement walls. Walls associated with conditioned basements shall be insulated from the top of the basement wall down to 10 feet (3,048 mm) below grade or to the basement floor, whichever is less. Walls associated with unconditioned basements shall meet this requirement unless the floor overhead is insulated in accordance with Sections N1102.1.1 and N1102.2.7.

**Exception:** Exterior basement walls of enclosed mechanical rooms.

*Commentary:* The HBA requested that the thermal envelope not extend into an enclosed mechanical room in a basement due to space limitations, and that there is a redundancy of insulating the walls when outside air is introduced into the area by either combustion air or outside air into the return air based on the new whole house ventilation requirements.

N1102.4.1.2 (R402.4.1.2) Testing. **Not adopted by the city.** The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding 5 air changes per hour in Zones 1 and 2, and 3 air changes per hour in Zones 3 through 8. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the building official, testing shall be conducted by an approved third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the building official. Testing shall be performed at any time after creation of all penetrations of the building thermal envelope.

**During testing:**

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weather stripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.

Commentary: This new provision requires the testing of a new dwelling unit to demonstrate the building’s air tightness. The HBA considered such a test as an unwarranted cost to the homeowner and requested that the mandate be deleted.

N1103.2.2 (R403.2.2) Sealing (Mandatory). Ducts, air handlers, and filter boxes shall be sealed. Joints and seams shall comply with Section M1601.4.1 of this code.

Exceptions:

1. Air-impermeable spray foam products shall be permitted to be applied without additional joint seals.

2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Duct tightness shall be verified by either of the following:

1. Postconstruction test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 square feet (9.29 m²) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer’s air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 4 cfm (113.3 L/min) per 100 ft² (9.29 m²) of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the system, including the manufacturer’s air handler enclosure. All registers shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 3 cfm (85 L/min) per 100 square feet (9.29 m²) of conditioned floor area.

Exception: The total leakage test is not required for ducts and air handlers located entirely within the building thermal envelope.

Commentary: The testing of duct sealing in a new house would be an expense of approximately $400 or more. This maintains a local amendment to visually inspect for air leakage instead of having a testing and balancing company perform the test.

N1103.2.2.1 (R403.2.2.1) Sealed air handler. Not adopted by the city. Air handlers shall have a manufacturer’s designation for an air leakage of no more than 2 percent of the design air flow rate when tested in accordance with ASHRAE 193.
Commentary: There is apprehension as to whether the manufacturers are held to a maximum 2% air leakage requirement at this time. Staff has verified that major manufacturers of air handlers are not subject to the ASHRAE 193 test at this time.

N1103.2.3 (R403.2.3) Building cavities (Mandatory). Building framing cavities shall not be used as ducts or plenums.

   **Exception:** Stud spaces and floor joist cavities may be used for return air plenums.

Commentary: With the local exception, the use of a floor joist and stud space that is inside of the thermal envelope is allowed to continue instead of a new mandate to require all plenums to be ducted.

N1103.4 (R403.4) Service hot water systems. Energy conservation measures for service hot water systems shall be in accordance with Sections N1103.4.1 and N1103.4.2: the Plumbing Code.

Commentary: This reverts any insulation of hot water services within a dwelling to the Plumbing Code.

N1104.1 (R404.1) Lighting equipment (Mandatory). **Not adopted by the city.** A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high-efficacy lamps or a minimum of 75 percent of the permanently installed lighting fixtures shall contain only high-efficacy lamps.

   **Exception:** Low-voltage lighting shall not be required to utilize high-efficiency lamps.

Commentary: To conserve energy, the IRC in 2009 required 50 percent and the 2012 IRC requires at least 75 percent of the lamps in permanently installed lighting fixtures to be compact fluorescent lamps or other high-efficacy lamps. The 75 percent requirement of CFL’s may be met at the time of inspection, but the owner may install or replace with less expensive options. The provision that was eliminated in the 2009 IRC is again proposed to be deleted locally in the 2012 IRC.

M1301.4 Plastic pipe, fittings and components. **Not adopted by the city.** Plastic pipe, fittings and components shall be third-party certified as conforming to NSF 14.

Commentary: Mechanical piping systems currently have no such rating in Sioux Falls.

M1305.1.4.1 Ground clearance. Equipment and appliances supported from the ground shall be level and firmly supported on a concrete slab or other approved material extending not less than 1 1/2 inches (38 mm) above the adjoining ground. Such support shall be in accordance with the manufacturer’s installation instructions. Appliances suspended from the floor shall have a clearance of not less than 6 inches (152 mm) from the ground.
Equipment and appliances including the service areas shall be provided with a minimum 80-inch (2032 mm) headroom clearance.

Commentary: Prefab concrete slabs used to support residential appliances are not thicker than 1 1/2 inches. This additionally maintains a headroom clearance of 6 feet 8 inches to accommodate future service work for a mechanical appliance.

M1403.1 Heat pumps and air conditioners. The minimum unobstructed total area of the outside and return air ducts or openings and supply air ducts to a heat pump and/or air conditioner shall be not less than 6 square inches per 1,000 Btu/h (13,208 mm²/kW) output rating or as indicated by the conditions of the listing of the heat pump air conditioner. Electric heat pumps shall conform to UL 1995.

Commentary: Heat pumps and air conditioners require the same amount of airflow to operate properly.

M1411.5 Insulation of refrigerant piping. Piping and fittings for refrigerant vapor (suction) lines shall be insulated with insulation having a thermal resistivity of at least R-2 R-4 and having external surface permeance not exceeding 0.05 perm [2.87 ng/(s · m² · Pa)] when tested in accordance with ASTM E 96.

Commentary: Pre-assembled refrigerant tubing sets are not locally available with an R-4 insulation but are capable of an R-2 thermal resistivity.

M1502.4.2 Duct installation. Exhaust ducts shall be supported at 4-foot (1219 mm) intervals not to exceed 12 feet (3658 mm) and shall be secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened. Ducts shall not be joined with screws or similar fasteners that protrude more than 1/8 inch (3.2 mm) into the inside of the duct.

Commentary: This provision is inconsistent with the other portions of the IMC, IFGC, and the fuel gas provision of the residential code. Any protrusion of a screw into a clothes dryer exhaust would catch lint and create a fire hazard.

M1506.2 Exhaust openings. Air exhaust openings shall terminate not less than 3 feet (914 mm) from property lines, 3 feet (914 mm) from operable and nonoperable openings into the building, and 10 feet (3048 mm) from mechanical air intakes except where the opening is located 3 feet (914 mm) above the air intake. Openings shall comply with Sections R303.5.2 and R303.6.

Commentary: There is no risk of an exhaust termination to the outside adjacent to a nonoperable opening.
**Section M1508. Subslab Soil Exhaust Systems.**

**M1508.1 General.** When a subslab soil exhaust system is provided, the duct shall conform to the requirements of this section.

**M1508.2 Materials.** Subslab soil exhaust system duct material shall be air duct material listed and labeled to the requirements of UL 181 for Class 0 air ducts, or any of the following piping materials that comply with the *plumbing code* as building sanitary drainage and vent pipe: cast iron; galvanized steel; brass or copper pipe; copper tube of a weight not less than that of copper drainage tube, Type DWV; and plastic piping.

**M1508.3 Grade.** Exhaust system ducts shall not be trapped and shall have a minimum slope of 1/8 unit vertical in 12 units horizontal (1 percent slope).

**M1508.4 Termination.** Subslab soil exhaust system ducts shall extend through the roof and terminate at least 6 inches (152 mm) above the roof and at least 10 feet (3,048 mm) from any operable openings or air intake.

Commentary: This provision is found in an appendix chapter that has not been adopted. If it chosen to install a sub slab soil exhaust system, this placement into Chapter 15 at least provides a standard for slope and termination requirements.

<table>
<thead>
<tr>
<th>Duct Size</th>
<th>Galvanized Minimum Thickness Inches</th>
<th>Equivalent Galvanized Gage No.</th>
<th>Aluminum Minimum Thickness (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round ducts and enclosed rectangular ducts</td>
<td>0.0157</td>
<td>30-28</td>
<td>0.0175</td>
</tr>
<tr>
<td>14 inches or less</td>
<td>0.0187</td>
<td>26</td>
<td>0.018</td>
</tr>
<tr>
<td>&gt;14-16 to and 18 inches</td>
<td>0.0236</td>
<td>24</td>
<td>0.023</td>
</tr>
<tr>
<td>&gt;18-20 inches and over</td>
<td>0.0157</td>
<td>28</td>
<td>0.0175</td>
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<tr>
<td>Exposed rectangular ducts</td>
<td>0.0187</td>
<td>26</td>
<td>0.018</td>
</tr>
<tr>
<td>14 inches or</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 14” inches</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm.

a. For duct gages and reinforcement requirements at static pressures of 1/2 inch, 1 inch, and 2 inches w.g., SMACNA *Duct Construction Standard* Tables 2-1; 2-2 and 2-3 shall apply.

Commentary: This maintains a legacy code requirement to accept a lighter gage material for ducts and pipes in residential construction.
M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following:

1. *Equipment* connected to duct systems shall be designed to limit discharge air temperature to a maximum of 250°F (121°C).

2. Factory-made air ducts shall be constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1).

3. Fibrous duct construction shall conform to the SMACNA *Fibrous Glass Duct Construction Standards* or NAIMA *Fibrous Glass Duct Construction Standards*.

4. Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653. Metallic ducts shall be fabricated in accordance with SMACNA Duct Construction Standards Metal and Flexible, except that sheet steel and strip used for duct, connectors, and round duct shall be G40 galvanized steel of lock-forming quality.

5. Use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.

6. Duct systems shall be constructed of materials having a flame spread index not greater than 200.

7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:

   7.1. These cavities or spaces shall not be used as a plenum for supply air.

   7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.

   7.3. Stud wall cavities shall not convey air from more than one floor level.

   7.4. Stud wall cavities and joist space plenums shall be isolated from adjacent concealed spaces by tight-fitting fire-blocking in accordance with Section R602.8.

   7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.

Commentary: SMACNA standards are referenced in the residential code for the first time. These standards are typically used for commercial and industrial construction. The standard would have required a thicker galvanized coating, a G60, which has been modified to a G40 which is the standard thickness of galvanizing for residential ducts.
**M1601.2 Factory-made ducts.** Factory-made air ducts or duct material shall be approved for the use intended, and shall be installed in accordance with the manufacturer’s installation instructions. Each portion of a factory-made air duct system shall bear a listing and label indicating compliance with UL 181 and UL 181A or UL 181B.

Flexible air ducts shall be limited in length to 14 feet. Flexible air connectors are not allowed.

Commentary: This maintains a local amendment to limit the use of flexible air ducts to maximum lengths of 14 feet and to not allow flexible air connectors. The efficiency of actual air-flow through a pre-manufactured flexible air duct is greatly limited after a length of more than 14 feet.

**M1601.4.1 Joints, seams and connections.** All longitudinal and transverse joints, seams, and connections in metallic and nonmetallic ducts shall be constructed as specified in SMACNA HVAC Duct Construction Standards—Metal and Flexible and NAIMA Fibrous Glass Duct Construction Standards. All joints, longitudinal and transverse seams, and connections in ductwork outside the building thermal envelope; all return ducts located within 10 feet (3.05 m) of any appliance or all return ducts within a mechanical room; and all supply main trunk ducts and branch duct connections to the main trunk ducts shall be securely fastened and sealed with welds, gaskets, mastics (adhesives), mastic-plus-embedded-fabric systems or tapes.

Closure systems used to seal flexible air ducts and flexible air connectors shall comply with UL 181B and shall be marked “181 B-FX” for pressure-sensitive tape or “181 BM” for mastic. Duct connections to flanges of air distribution system equipment shall be sealed and mechanically fastened. Mechanical fasteners for use with flexible nonmetallic air ducts shall comply with UL 181B and shall be marked 181B-C. Crimp joints for round metallic ducts shall have a contact lap of not less than 1 inch (25.4 mm) and shall be mechanically fastened by means of not less than three sheet-metal screws or rivets equally spaced around the joint.

Closure systems used to seal metal ductwork shall be installed in accordance with the manufacturer’s instructions. Round metallic ducts shall be mechanically fastened by means of at least three sheet metal screws or rivets spaced equally around the joint. Unlisted duct tape shall not be permitted as a sealant on any duct.

**Exceptions:**

1. Spray polyurethane foam shall be permitted to be applied without additional joint seals.

2. Where a duct connection is made that is partially inaccessible, three screws or rivets shall be equally spaced on the exposed portion of the joint so as to prevent a hinge effect.

3. Continuously welded and locking-type longitudinal joints and seams in ducts operating at static pressures less than 2 inches of water column (500 Pa) pressure classification shall not require additional closure systems.

Commentary: The code has required all ducts to be sealed for the last three code cycles. The HVAC industry requested that only certain portions of a duct system necessitated sealing such as ducts outside...
of the thermal envelope and the ducts within the vicinity of a mechanical room due to a possible carbon monoxide mishap. The sealing of all ducts inside of the thermal envelope is considered as an additional expense as compared to the amount of air loss which occurs on an unsealed duct inside of the thermal envelope.

M1601.4.3 Support. Metal ducts shall be supported by 1/2-inch-wide (13 mm) 18-gage, 1-inch-wide (25 mm) 24-gage, or 1 1/2-inch-wide (39 mm) 26-gage metal straps or 12-gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other approved means. Nonmetallic ducts shall be supported in accordance with the manufacturer’s installation instructions.

Commentary: This maintains lesser gage of strap to accommodate residential contractors that do not have the machinery necessary to shear a thicker gage material. A 1-inch 24-gage strap is equivalent to a ½-inch 18-gage strap.

M2101.1 General. Hydronic piping shall conform to Table M2101.1. Approved piping, valves, fittings and connections shall be installed in accordance with the manufacturer’s installation instructions. Pipe and fittings shall be rated for use at the operating temperature and pressure of the hydronic system. Used pipe, fittings, valves or other materials shall be free of foreign materials.

Exception: Polyvinyl Chloride (PVC) plastic pipe conforming to ASTM D1785 or ASTM D2241 is an allowable material for hydronic piping.

Commentary: PVC is the piping of choice locally and is accepted in the IMC but not referenced in the IRC.

G2407.6 (304.6) Outdoor combustion air. Outdoor combustion air shall be provided through opening(s) to the outdoors in accordance with Section G2407.6.1, G2407.6.2, or G2407.6.3. The minimum dimension of air openings shall be not less than 3 inches (76 mm).

Combustion air intake opening shall be located a minimum of 3 feet from a gas meter.

G2407.6.3 Alternate combustion air sizing. As an alternate the net free area of openings, ducts, or plenums supplying air to an area containing gas- and oil-burning appliances shall be in accordance with B149.1-10, Natural Gas and Propane Installation Code, published by the Canadian Standards Association (CSA).

When all air is taken from the outdoors for appliances one outside air duct may be used and shall terminate below the draft hood. An exterior opening may be used in place of a duct provided that it terminates within 1 foot (300 mm) above, and within 2 feet (600mm) horizontally from, the burner level of the appliance having the largest input.

The combustion air duct is required to be upsized one diameter size when a dryer is installed in the same room as the combustion air.
Commentary: This maintains a reduced size of combustion air opening, consistent with B149.1-10, Natural Gas and Propane Installation Code published by the Canadian Standards Association. This Canadian Standard has been expanded at the request of the Mechanical Board of Appeals to include appliances greater than 300,000 Btu/hr inputs.

G2408.1 (305.1) General. Equipment and appliances shall be installed as required by the terms of their approval, in accordance with the conditions of listing, the manufacturer’s instructions, and this code. Manufacturer’s installation instructions shall be available on the job site at the time of inspection. Where a code provision is less restrictive than the conditions of the listing of the equipment or appliance or the manufacturer’s installation instructions, the conditions of the listing and the manufacturer’s installation instructions shall apply.

After completion of the installation, all safety and operating controls and venting shall be tested before placing the burner in service in accordance with the manufacturer’s installation instructions. The following requirements need to be recorded and affixed to the inside of the gas train access panel:

1. The rate of flow of the gas or fuel shall be adjusted to within plus or minus 5 percent of the required Btu/hr rating at the manifold pressure specified by the manufacturer. When the prevailing pressure is less than the manifold pressure specified, the rates shall be adjusted at the prevailing pressure.

2. The gas inlet pressure per the manufacturer’s installation settings.

3. The temperature rise across the heat exchanger per the manufacturer’s installation settings.

4. The static pressure of the supply and return ducts per the manufacturer’s installation settings.

Unlisted appliances approved in accordance with Section G2404.3 shall be limited to uses recommended by the manufacturer and shall be installed in accordance with the manufacturer’s instructions, the provisions of this code and the requirements determined by the code official.

Commentary: This maintains the requirement to place the furnace and/or boiler into operation in accordance with the manufacturer’s installation settings. This provision is now found in the 2012 IFGC but has not yet made it into the IRC.

G2411.1.1 (310.1.1) CSST. Corrugated stainless steel tubing (CSST) gas piping systems shall be bonded to the electrical service grounding electrode system at the point where the gas service enters the building. The bonding jumper shall connect to a metallic pipe or fitting between the point of delivery and the first downstream CSST fitting. The bonding jumper shall be not smaller than 6 AWG copper wire or equivalent. Gas piping systems that contain one or more segments of CSST shall be bonded in accordance with this section.
Commentary: This maintains consistency with the 2009 Uniform Plumbing Code to simply require the bonding of CSST piping at the point where the gas service enters the building.

G2415.2 (404.2) CSST. CSST piping systems shall be installed in accordance with the terms of their approval, the conditions of listing, the manufacturer’s instructions and this code.

The piping located on the exterior extending from the gas meter to the inside of the structure shall be a metallic pipe in compliance with Section G2414.4. The entrance into the structure shall be provided with the appropriate transition flange where an alternate gas piping material is utilized on the inside of the structure.

Commentary: This provides consistency with the Plumbing Code that does not allow CSST piping from the meter to the entrance into the dwelling to eliminate tampering of the gas piping and to provide a rigid pipe connection from the meter to the entrance into the structure.

G2415.3 (404.3) Prohibited locations. Piping shall not be installed in or through a ducted supply, return or exhaust, or a clothes chute, chimney or gas vent, dumbwaiter or elevator shaft. Piping installed downstream of the point of delivery shall not extend through any townhouse unit other than the unit served by such piping.

Commentary: This is taken out of the IRC because it is not consistent with the Plumbing Code and Plumbing Contractors are who typically runs gas piping.

G2427.4.1.1 (503.4.1.1) (IFGS) Plastic vent joints. Plastic pipe and fittings used to vent appliances shall be installed in accordance with the appliance manufacturer’s installation instructions. Where a primer is required, it shall be of a contrasting color.

Exception: Where compliance with this section would conflict with the appliance manufacturer’s installation instructions.

Commentary: This requires all primers to be a contrasting color to be able to verify that the pipe has been adequately primed.

Part VII—Plumbing. The following chapters are not adopted by the city; Chapter 25—Plumbing Administration; Chapter 26—General Plumbing Requirements; Chapter 27—Plumbing Fixtures; Chapter 28—Water Heaters; Chapter 29—Water Supply and Distribution; Chapter 30—Sanitary Drainage; Chapter 31—Vents; Chapter 32—Traps; and Chapter 33—Storm Drainage.

The provisions of the 2009 Uniform Plumbing Code of the city of Sioux Falls shall apply to the installation, alterations, repairs, and replacement of plumbing systems, including equipment, appliances, fixtures, and appurtenances, and where connected to a water or sewage system for detached one- and two-family dwellings and multiple single-family dwellings (town houses) not more than three stories high with separate means of egress and their accessory structures.
Commentary: Part VII—Plumbing of the IRC references the International Plumbing Code. The South Dakota State Plumbing Commission has mandated the use of the 2009 Uniform Plumbing Code. To avoid inconsistencies, the plumbing chapters referenced in Part VII are not adopted by the City and instead any plumbing systems for residential construction are referenced to the 2009 Uniform Plumbing Code.

Part VIII—Electrical. The following chapters are not adopted by the city: Chapter 34—General Requirements; Chapter 35—Electrical Definitions; Chapter 36—Services; Chapter 37—Branch Circuit and Feeder Requirements; Chapter 38—Wiring Methods; Chapter 39—Power and Lighting Distribution; Chapter 40—Device and Luminaires; Chapter 41—Appliance Installation; Chapter 42—Swimming Pools; Chapter 43—Class 2 Remote-Control, Signaling and Power-Limited Circuits.

The provisions of the 2011 National Electrical Code of the city of Sioux Falls shall apply to the installation, alteration, repair, relocation, replacement, addition to, use, or maintenance of any electrical system, apparatus, wiring, or equipment for electrical, light, heat, power, fire alarms, and associate controls for detached one- and two-family dwellings and multiple single-family dwellings (town houses) not more than three stories high with separate means of egress and their accessory structures.

Commentary: Part VIII—Electrical of the IRC references the electrical standards. The South Dakota State Electrical Commission has mandated the use of the 2011 National Electrical Code and does not recognize any inconsistencies that may be found in Part VIII of the IRC. To avoid inconsistencies, the electrical chapters referenced in Part VIII are not adopted by the City and instead any electrical systems for residential construction are referenced directly to the 2011 National Electrical Code.

AG102.1 General. For the purposes of these requirements, the terms used shall be defined as follows and as set forth in Chapter 2.

ABOVE-GROUND/ON-GROUND POOL. See “Swimming pool.”

BARRIER. A fence, wall, building wall or combination thereof that completely surrounds the swimming pool and obstructs access to the swimming pool.

HOT TUB. See “Swimming pool.”

IN-GROUND POOL. See “Swimming pool.”

RESIDENTIAL. That which is situated on the premises of a detached one- or two-family dwellings, or a one-family town house not more than three stories in height.

SPA, NONPORTABLE. See “Swimming pool.”

SPA, PORTABLE. A nonpermanent structure intended for recreational bathing; in which all controls, water-heating and water-circulating equipment are an integral part of the product.
**SWIMMING POOL.** Any structure intended for swimming or recreational bathing that contains water more than 18 to 24 inches (457 to 610 mm) deep. This includes in-ground, aboveground, and on-ground swimming pools, hot tubs and spas.

**SWIMMING POOL, INDOOR.** A swimming pool that is totally contained within a structure and surrounded on all four sides by the walls of the enclosing structure.

**SWIMMING POOL, OUTDOOR.** Any swimming pool that is not an indoor pool.

**AG105.1 Application.** The provisions of this appendix shall control the design of barriers for residential swimming pools, spas and hot tubs. These design controls are intended to provide protection against potential drownings and near-drownings by restricting access to swimming pools, spas and hot tubs.

This requirement shall be applicable to all new swimming pools hereafter constructed, other than indoor pools, and shall apply to all existing pools, which have a depth of 18 inches (457 mm) or more of water. No person in possession of land within the city, either as owner, purchaser, lessee, tenant, or a licensee, upon which is situated a swimming pool having a depth of 18 inches (457 mm) or more shall fail to provide and maintain such barrier as herein provided.

**AG105.2 Outdoor swimming pool.** An outdoor swimming pool, including an in-ground, above-ground or on-ground pool, hot tub or spa, shall be surrounded by a barrier that shall be installed, inspected, and approved prior to filling with water that completely surrounds and obstructs access to the swimming pool, which shall comply with the following:

1. The top of the barrier shall be at least 42 to 48 inches (1067 to 1219 mm) above grade measured on the side of the barrier that faces away from the swimming pool. The maximum vertical clearance between grade and the bottom of the barrier shall be 2 inches (51 mm) measured on the side of the barrier that faces away from the swimming pool. Where the top of the pool structure is above grade, such as an above-ground pool, the barrier may be at ground level, such as the pool structure, or mounted on top of the pool structure. Where the barrier is mounted on top of the pool structure, the maximum vertical clearance between the top of the pool structure and the bottom of the barrier shall be 4 inches (102 mm).

2. Openings in the barrier shall not allow the passage of a 4-inch-diameter (102 mm) sphere.

3. Where an aboveground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps, then:
   3.1. The ladder or steps shall be capable of being secured, locked, or removed to prevent access; or
   3.2. The ladder or steps shall be surrounded by a barrier, which meets the requirements of Item 1 above. When the ladder or steps are secured, locked, or removed, any opening created shall not allow the passage of a 4-inch-diameter (102 mm) sphere.
Solid barriers which do not have openings, such as a masonry or stone wall, shall not contain indentations or protrusions, except for normal construction tolerances and tooled masonry joints.

4. All gates or door openings through the barrier shall be equipped with self-closing and self-latching devices for keeping the door or gate securely closed at all times when the pool is not in actual use, except that the door of any dwelling that forms part of the enclosure need not be so equipped.

Where the barrier is composed of horizontal and vertical members, and the distance between the tops of the horizontal members is less than 45 inches (1143 mm), the horizontal members shall be located on the swimming pool side of the fence. Spacing between vertical members shall not exceed 1 3/4 inches (44 mm) in width. Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1 3/4 inches (44 mm) in width.

5. Where the barrier is composed of horizontal and vertical members, and the distance between the tops of the horizontal members is 45 inches (1143 mm) or more, spacing between vertical members shall not exceed 4 inches (102 mm). Where there are decorative cutouts within vertical members, spacing within the cutouts shall not exceed 1 3/4 inches (44 mm) in width.

6. Maximum mesh size for chain link fences shall be a 2 1/4-inch (57 mm) square, unless the fence has slats fastened at the top or the bottom which reduce the openings to not more than 1 3/4 inches (44 mm).

7. Where the barrier is composed of diagonal members, such as a lattice fence, the maximum opening formed by the diagonal members shall not be more than 1 3/4 inches (44 mm).

8. Access gates shall comply with the requirements of Items 1 through 7, and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool, and shall be self-closing and have a self-latching device. Gates, other than pedestrian access gates, shall have a self-latching device. Where the release mechanism of the self-latching device is located less than 54 inches (1372 mm) from the bottom of the gate, the release mechanism and openings shall comply with the following:

8.1. The release mechanism shall be located on the pool side of the gate at least 3 inches (76 mm) below the top of the gate; and

8.2. The gate and barrier shall have no opening larger than 1/2 inch (12.7 mm) within 18 inches (457 mm) of the release mechanism.

9. Where a wall of a dwelling serves as part of the barrier, one of the following conditions shall be met:
9.1. The pool shall be equipped with a powered safety cover in compliance with ASTM F 1346;

9.2. Doors with direct access to the pool through that wall shall be equipped with an alarm which produces an audible warning when the door and/or its screen, if present, are opened. The alarm shall be listed and labeled in accordance with UL 2017. The deactivation switch(es) shall be located at least 54 inches (1372 mm) above the threshold of the door; or

9.3. Other means of protection, such as self-closing doors with self-latching devices, which are approved by the governing body, shall be acceptable as long as the degree of protection afforded is not less than the protection afforded by Item 9.1 or 9.2 described herein.

10. Where an above-ground pool structure is used as a barrier or where the barrier is mounted on top of the pool structure, and the means of access is a ladder or steps:

10.1. The ladder or steps shall be capable of being secured, locked or removed to prevent access; or

10.2. The ladder or steps shall be surrounded by a barrier which meets the requirements of Items 1 through 9. When the ladder or steps are secured, locked or removed, any opening created shall not allow the passage of a 4-inch diameter (102 mm) sphere.

AG105.3 Indoor swimming pool. Not adopted by the city. Walls surrounding an indoor swimming pool shall comply with Item 9 of Section AG105.2.

AG105.4 Prohibited locations. Not adopted by the city. Barriers shall be located to prohibit permanent structures, equipment or similar objects from being used to climb them.

AG105.5 Barrier exceptions. Spas or hot tubs with a safety cover that comply with ASTM F 1346 shall be exempt from the provisions of this appendix. Modifications in individual cases, upon a showing of good cause with respect to height, nature, or location of a fence, wall, gates, or latches, or the necessity thereof, may be made by the building official, provided the protection as sought hereunder is not reduced thereby. The building official may grant permission for other protective devices or structures to be used as long as the degree of protection afforded by this substitute device or structure is not less than the protection afforded by the wall, fence, gate, and latch described herein. A reasonable period within which to comply with the requirements of this section for existing swimming pools shall be allowed, which period shall not exceed 90 days after notification by the building official.

Commentary: This maintains a local ordinance that requires a barrier or fence to separate a pool or spa that has a depth of water of greater than 18 inches.