The Minnesota Energy Code requires that all penetrations through an exterior wall air barrier be sealed. Sealing of the opening applies to all penetrations including the service entrance, conduit, cables, panels, recessed luminaires and electrical boxes.

**EQUIPMENT LISTING AND LABELING**

- **NEC 230.70** The service disconnecting means shall be installed at a readily accessible location either outside a building or structure or inside nearest the point of entrance of the service-entrance conductors.

**NEC 310.15 Conductor Sizes For 120/240-Volt 3-Wire, Single-Phase, Dwelling Services And Feeders**

<table>
<thead>
<tr>
<th>Conductor</th>
<th>Copper</th>
<th>Aluminum</th>
<th>Service Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 AWG</td>
<td>2 AWG</td>
<td>100 amps</td>
<td></td>
</tr>
<tr>
<td>1 AWG</td>
<td>1/0</td>
<td>150 amps</td>
<td></td>
</tr>
<tr>
<td>2/0</td>
<td>4/0</td>
<td>200 amps</td>
<td></td>
</tr>
<tr>
<td>400 kcmil</td>
<td>600 kcmil</td>
<td>400 amps</td>
<td></td>
</tr>
</tbody>
</table>

- **NEC 110.14** Conductors of dissimilar metals shall not be intermixed unless the device is listed for the purpose. Listed anti-oxidant compound shall be used on all aluminum conductor terminations unless the device manufacturer’s instructions state that it is not required.

**NEC 300.7 Portions of raceways or sleeves passing from the interior to the exterior of a building or subject to different temperatures shall be filled with an approved material to prevent condensation from entering equipment.**

- **NEC 230.54** Service entrance and overhead service conductors shall be arranged so that water will not enter the service enclosure.

**NEC 300.9** The interior of raceways installed in wet stations above grade shall be considered wet locations.

- **NEC 300.4** Conductors 4 AWG or larger shall be protected by a bushing when entering an enclosure through a raceway.

**GROUNDING AND BONDING**

- **NEC 250.32** Buildings supplied by a feeder or branch circuit shall have an equipment grounding conductor run with the supply conductors and connected to the grounding electrode system at the building.

- **NEC 250.50** All grounding electrodes that are present at each building or structure shall be bonded together to form the grounding electrode system.

- **NEC 250.50** Acceptable grounding electrodes include a metal underground water pipe, a metal frame of a building or structure, a rod, pipe or plate electrode, a concrete encased electrode and a ground ring.

- **NEC 250.53** A metal underground water pipe electrode shall be supplemented by an additional electrode.

- **NEC 250.53** Unless a rod, pipe and plate electrode has a resistance to ground of 25 ohms or less, it shall be supplemented with another acceptable electrode.

- **NEC 250.66** The conductor that is the sole connection to a rod, pipe or plate electrode is not required to be larger than #6 AWG copper.

- **NEC 250.67** The grounding electrode conductor shall be continuous, securely fastened and protected from physical damage. Grounding electrode conductors are not required to comply with the minimum cover requirements in 300.5

- **NEC 250.28** The main bonding jumper - generally the green bonding screw provided by the panel manufacturer - shall be installed in the main service panel.

- **NEC 250.104** The interior metal water piping and other metal piping that may become energized shall be bonded to the service equipment with a bonding jumper sized the same as the grounding electrode conductor.

**UNDERGROUND WIRING**

- **NEC 300.5** Direct buried cable or conduit or other raceways shall meet the following minimum cover requirements:

<table>
<thead>
<tr>
<th>Direct Burial Cable</th>
<th>Rigid or Intermediate Metal Conduit</th>
<th>Non Metallic Raceway (PVC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 inches</td>
<td>6 inches</td>
<td>18 inches</td>
</tr>
</tbody>
</table>

The minimum cover for 120-volt residential branch circuits rated 20 amps or less and provided with GFCI protection at their source is permitted to be 12 inches.

- **NEC 680.10** Underground wiring is not permitted under pools or within 5 feet horizontally from the walls of the pool, unless supplying permitted pool equipment.

- **NEC 300.5** Underground service laterals shall have their location identified by a warning ribbon placed in the trench at least 12” above the underground installation.

- **NEC 300.5** Where subject to ground movement, direct buried cables and raceways shall be installed with expansion capability to prevent damage to the enclosed conductors and the connected equipment.

- **NEC 110.14** Wire splicing devices for direct burial conductors shall be listed for such use.

- **NEC 300.5** Conductors emerging from underground shall be installed in rigid metal conduit, intermediate metal conduit, or Schedule 80 rigid nonmetallic conduit from 18" below grade or the minimum cover distance up to the point of termination above ground.

**Electrical Inspection Checklist for Dwellings**

Based on the 2014 National Electrical Code® (NEC®).

An owner who files a Request for Electrical Inspection form with the Department of Labor & Industry or other electrical inspection authority is signing an affidavit that they own and occupy the residence and that they will personally perform all of the electrical work, including the planning and laying out.

The term “owner” is defined as a natural person who physically performs electrical work on premises the person owns and actually occupies as a residence or owns and will occupy as a residence upon completion of construction.

A separate request for electrical inspection form with the required fees must be submitted to the Department at or before the start of any electrical work that is required to be inspected.

It is illegal for an owner to install electrical wiring in a mobile home or recreational vehicle park, or on property that is rented, leased, or occupied by others.

All wiring including underground cable and conduit shall be inspected before it is concealed by insulation, sheet-rock, paneling, or other materials. Except for the final connection to switches, receptacles, and lighting fixtures, all ground wires and other wires in boxes must be spliced and pigtailed for the rough-in inspection.

The installer shall notify the inspector for final inspection when the wiring is complete, before the wiring is utilized and the space occupied.

This is a general overview of residential electrical requirements and no claim is made that this information is complete or beyond question.
**PLAN YOUR Wiring PROJECT**

If wiring is concealed before inspection, the person responsible for concealing the wiring shall be responsible for all costs associated with uncovering and replacing the covering material.

The installer shall schedule a final inspection when the electrical work is completed prior to the wiring being utilized and the space occupied.

**GENERAL CIRCUIT REQUIREMENTS**

NEC 406.4 and 406.12 All 125-volt, 15- and 20-amp receptacles installed or replaced in dwellings shall be listed tamper-resistant. Three exceptions include receptacles located 5½ feet or more above the floor, a receptacle in space dedicated for an appliance that is not readily moved and receptacles that are part of a luminaire.

NEC 210.12 All branch circuits supplying 125-volt, 15- and 20-amp outlets or devices in dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, laundry areas, closets, hallways, or similar areas shall be protected by a listed combination type AFCI device. AFCI protection is also required where branch circuit wiring in the above locations is modified, replaced or extended.

NEC 210.11 and 422.12 In addition to the branch circuits installed to supply general illumination and receptacle outlets in dwelling units, the following minimum requirements apply:

- Two 20-amp circuits for the kitchen receptacles
- One 20-amp circuit for the laundry receptacles
- One 20-amp circuit for the bathroom receptacles
- One branch circuit for central heating equipment
- One branch circuit for garage receptacles

NEC 406.4 and 406.9 Receptacles that are installed or replaced in wet locations shall be listed as weatherproof. AFCI protection is also required where branch circuit wiring in the above locations is modified, replaced or extended.

NEC 210.52 Receptacle outlets in habitable rooms shall be installed so that no point measured horizontally along the floor line in any wall space is more than 6-feet from a receptacle outlet. A receptacle shall be installed in each wall space 2-feet or more in width. NEC 210.52 At kitchen countertops, receptacle outlets shall be installed so that no point along the wall line is more than 20-inches above the countertop, or more than 12-inches below the countertop.

NEC 210.52 & 406.9 At least one receptacle accessible from grade shall be installed at the front and back of a dwelling with an extra duty cover that is weatherproof whether or not an attachment plug cap is inserted. NEC 210.52 Balconies, decks and porches accessible from inside a dwelling unit shall have at least one receptacle located less than 6½ feet above the floor.

NEC 210.52 In attached and detached garages at least one receptacle shall be installed for each car space.

**WIRING METHODS**

NEC 314.23 All electrical boxes shall be rigidly secured to the building structure.

NEC 314.27 A listed fan box shall be installed where spare conductors are installed to a location acceptable to a ceiling fan.

NEC 334.30 Type NM (nonmetallic) cables shall be secured every 4.5-feet and within 12-inches of each box.

NEC 314.17 The outer jacket of type NM cable shall be secured to the box and extend into the box at least ¾ inch.

NEC 300.14 The length of conductors included in equipment grounding conductors at all boxes shall be 6-inches with at least 3 inches outside the box.

NEC 300.4 Cables and raceways shall be protected from damage. Where installed through holes in wood framing, the cable shall be at least ¾ inch from the nearest edge of the wood or shall be protected by a 1½ inch steel plate.

**CUBIC INCHES REQUIRED FOR BOXES**

<table>
<thead>
<tr>
<th>Cubic_inches</th>
<th>Type NM cables</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 insulating</td>
<td>16 cubic inches</td>
</tr>
<tr>
<td>All 4 grounding wires</td>
<td>2 cubic inches</td>
</tr>
<tr>
<td>1 switch</td>
<td>4 cubic inches</td>
</tr>
<tr>
<td>1 receptacle</td>
<td>2 cubic inches</td>
</tr>
<tr>
<td>All cable clamps</td>
<td>2 cubic inches</td>
</tr>
</tbody>
</table>

**NEC 410.16** Cubic inches in clothes closets shall have the following minimum clearances from the storage space:

- 12 inches for totally enclosed surface mounted incandescent or LED luminaires
- 6 inches for recessed totally enclosed incandescent, fluorescent or LED luminaires
- 6 inches for surface mounted or recessed equipment

Surface mounted fluorescent or LED luminaires listed for installation within the defined storage space are permitted.

**NEC 410.2** Closet storage space extends from the floor to a height of 6-feet or the highest clothes-hanging rod and out 24-inches from the sides and back of the closet wall and continuing to the ceiling at 12-inches or the shelf width, whichever is greater.

**NEC 410.16** Incandescent luminaires with open or partially enclosed lamps and pendant fixtures or lamp-holders are not permitted in clothes closets.

**NEC 410.10** Luminaires installed in wet or damp locations shall be installed so that water cannot enter or accumulate and shall be marked as suitable for use in wet or damp locations, correspondingly.