

<b>CITY &amp; COUNTY OF DENVER</b>		
<b>COMMUNITY PLANNING &amp; DEVELOPMENT</b>		
<b>BUILDING PERMIT POLICY</b>		
<b>Subject: Clarification on Residential Electric Infrastructure Requirements</b>		
<b>Approved by: Eric Browning, Building Official</b>		<b>Drafted by: Vranizan</b>
<b>Number: DEC Sections R404.4, R404.5, &amp; R404.6</b>	<b>Effective Date: July 13, 2023</b>	<b>Page: 1 of 3</b>

**Reference: 2022 Denver Energy Code (DEC)  
2023 National Electrical Code (NEC)**

**Scope:**

Section R404.5 Additional Electric Infrastructure was adopted as a new provision for residential buildings in the 2022 Denver Energy Code. The provision does not specify what types of fossil fuel appliances and equipment are covered by the requirements. The scope of this policy is to clarify applicability of the provision and provide additional guidelines for sizing the infrastructure.

Additionally, this policy outlines the electric infrastructure requirements for DEC Sections R404.4 One- and two-family dwellings and townhouses electric vehicle (EV) charging requirements and R404.6 Solar-Ready Zone in Table 1 to create a comprehensive summary of the sizing and installation requirements for electric infrastructure under the Denver Energy Code.

**Definitions:**

Residential Buildings: Detached one- and two-family dwellings, multiple single-family dwellings (townhouses), and Group R-3 and R-4 buildings three stories or less in height above grade plane.

**DEC R404.5 Applicability:**

The following fossil fuel appliance and equipment shall be installed in accordance with the requirements of Section R404.5:

1. Warm air furnaces without a minimum electrical circuit capacity of 40 amps for space cooling
  - o R404.5 Exception 1: Fossil fuel space heating equipment where a 208/240-volt electrical circuit with a minimum capacity of 40 amps exists for space cooling
2. Water heating equipment with an input capacity equal to or less than 300,000 Btu/h (including pool heaters)
  - o R404.5 Exception 2: Water heating equipment with an input capacity greater than 300,000 Btu/h that serves multiple dwelling units or sleeping units
3. Ranges, ovens, and stoves
4. Clothes dryers

The following installed fossil fuel appliance and equipment is exempt from the requirements of Section R404.5:

- Indoor fireplaces
- Outdoor fireplaces and firepits
- Outdoor grills
- Patio heaters

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**DEC R404.5 Infrastructure Guidelines:**

The guidelines in Table 1 are intended to provide clarification on the requirements for specific equipment and appliances. The electrical infrastructure sizing shall be per Table 1 and the NEC, and sizing requirements apply to the junction box, raceway, and conductors serving the electrical panel as required by R404.5.1. The electric panel, bus bar in the electric panel, and utility service must be sized to accommodate future electrical loads covered by this provision. Per R404.5.1, the junction box and electrical panel directory entry for the dedicated circuit breaker space shall have labels stating, “For future electric equipment”.

*Exception 1 Clarification:* DEC R404.5 includes an exception for space heating equipment where a 240-volt, 40-amp branch circuit exists for space cooling equipment. Where the installed space cooling requires less than 40 amps, the electric infrastructure will satisfy this exception where the receptacle and branch circuit conductor have a rating not lot less than 240-volts, 40-amp. The circuit breaker for the installed space cooling equipment shall be sized per the NEC or per the manufacturer’s requirements.

**Table 1. Sizing and Installation Guidelines for Required Electric Infrastructure**

<i>Code Section</i>	<i>Equipment / Appliance Type</i>	<i>Electrical Infrastructure Sizing Requirements</i>	<i>Electrical Panel Requirements</i>	<i>Location Requirements</i>
DEC R404.4	<b>Electric Vehicle Charging Infrastructure</b>	240-volt, 40-amp branch circuit for each required EV ready space	The panel shall have reserved physical space for a two-pole circuit breaker, labeled ‘EV Ready’ on the panelboard schedule	Locate an outlet, receptable, or ESVE at each required EV ready space
DEC R404.5	<b>Furnaces</b> <i>(unless Exception 1 applies)</i>	Sizing shall be based on an identified cold-climate heat pump sized per DEC R403.7	The panel shall have reserved physical space for a two-pole circuit breaker	Locate the junction box or receptacle within 12” of a dedicated physical space for the future heat pump. The planned location for the future heat pump shall be noted on the certificate (R401.3)
	<b>Service water heaters (storage and tankless)</b> <i>(unless Exception 2 applies)</i>	Sizing shall be based on an identified electric heat pump water heater appropriately sized for the dwelling unit (e.g., same first-hour rating as the installed gas storage water heater)	The panel shall have reserved physical space for a two-pole circuit breaker	Locate the junction box or receptacle within 12” of the installed gas water heater

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**Table 1. Sizing and Installation Guidelines for Required Electric Infrastructure (continued)**

<i>Code Section</i>	<i>Equipment / Appliance Type</i>	<i>Electrical Infrastructure Sizing Requirements</i>	<i>Electrical Panel Requirements</i>	<i>Location Requirements</i>
DEC R404.5	<b>Pool heaters</b>	Sizing shall be based on an identified electric heat pump pool heater appropriately sized for the pool	The panel shall have reserved space for a two-pole circuit breaker	Locate the junction box or receptacle within 12” of a dedicated physical space for the future heat pump. The planned location for the future heat pump shall be noted on the certificate (R401.3)
	<b>Ranges and stoves</b>	Sizing shall be based on an identified electric range or stove of an equivalent size and functionality to the installed gas stove	The panel shall have reserved physical space for a two-pole circuit breaker	Locate the junction box or receptacle within 12” of the installed gas range or stove
	<b>Clothes dryers</b>	Sizing shall be based on an identified electric clothes dryer with a similar capacity to the installed gas dryer	The panel shall have reserved physical space for a two-pole circuit breaker	Locate the junction box or receptacle within 12” of the gas clothes dryer
DEC R404.6	<b>Solar-Ready Infrastructure</b>	Minimum one-inch metal conduit, clearly labeled per R404.6.6 and capped at both ends	The panel shall have reserved space for a two- or three-pole circuit breaker (as required for future PV system) labeled “For Future Solar Electric”. The reserved space shall be positioned at the opposite (load) end from the input feeder location or main circuit location	The conduit shall run from a capped roof penetration sleeve in the attic to the designated inverter location. The capped roof penetration sleeve (sized to accommodate conduit) shall be installed adjacent to the solar-ready zone, located on a roof slope ≤ 1:12 (8%)