CITY OF MILPITAS
Office of Building Safety
455 E. Calaveras Blvd.
Milpitas, CA 95035
408-586-3240
www.milpitas.gov

FURNACE (RESIDENTIAL)

1. PERMIT INFORMATION

- ❑ The installation of new or replacement furnace and/or ductwork requires a mechanical permit.
  - Plans are required and must be submitted to the Permit Center, unless the furnace is to be installed in the same location as an existing furnace.
  - If installation of the equipment requires a new electrical circuit or modification to an existing electrical circuit, an electrical permit is also required. If a new gas line is required to supply the furnace, a plumbing permit is required.

- ❑ A Permit may be issued only to the Building Owner or their Authorized Agent [CRC 105.1].
  - See also *Authorized Agent Sample Letter*.
  - Where the Contractor is acting as the Owner's Authorized Agent, they must be a State of California Licensed Contractor with the proper license classification.

- ❑ If the work is performed by the Building Owner personally or by his/her workers and an inspection indicates the work cannot be completed satisfactorily, then a licensed contractor must perform the work.

- ❑ If the Building Owner hires workers, State Law requires the Building Owner to obtain Worker's Compensation Insurance. Proof of this insurance is required prior to inspection.

- ❑ If the property is regulated by a Homeowners Association, any exterior work must have approval of the Association. It is the property owner's responsibility to obtain this approval.

2. INSTALLATION REQUIREMENTS

- ❑ **Codes.** All work shall comply with the California Mechanical Code (CMC), California Plumbing Code (CPC), California Energy Code (CEnC), the Milpitas Municipal Code (MMC), and other adopted codes as applicable.
  - This document contains informational references to various California codes and the Milpitas Municipal Code, based on the 2022 and 2023 editions of those documents, respectively. For additional, or more specific, information and exceptions, please refer to the codes and standards specific to your project.

- ❑ Equipment shall be installed in accordance with the conditions of its listing, the manufacturer's installation instructions, and adopted codes as applicable. A copy of the manufacturer's installation and operating instructions shall be attached to the appliance. [CMC 303.1]

- ❑ **Location.**
  - **Residential Garages.** Appliances in residential garages, and spaces that open to the garage that are not part of the dwelling unit, shall be installed so that all burners and burner-ignition devices are located not less than 18 inches above the floor unless listed as flammable vapor ignition resistant [CMC 305.1].
    - **Physical Damage.** Appliances installed in garages shall be guarded against damage with barriers, through elevation, or by being located outside the normal path of vehicles [CMC 305.1.1].
    - **Access from the Outside.** Appliances in separate, enclosed spaces not accessible from the garage may be installed at floor level, provided the required combustion air is not taken from the garage [CMC 305.1.2].
  - **Bedrooms and Bathrooms.** Central heating furnaces may be installed in bedrooms or bathrooms provided they are either (1) of the direct vent type or (2) are installed in a closet used for no other purpose having a listed, gasketed, self-closing door and pull their combustion air from the outdoors [CMC 904.1].

- **Attic or Under-Floor Installations.**
  - **Access for servicing and removal.** An attic or under-floor space in which a furnace is installed shall be accessible through an opening and passageway sized to allow removal of the largest component of the appliance, to a minimum of 22 inches by 30 inches [CMC 304.4].
  - **Sizing of Passageway.** For passageways less than 6 feet in height, the distance to the appliance may not exceed 20 feet [CMC 304.4.1]. The passageway shall be unobstructed and have a solid floor not less than 24 inches wide for the full distance from the entrance opening to the appliance [CMC 304.4.2].
  - **Work Platform**. A level working platform must be provided in front of the service side of the appliance, with minimum dimensions no less than 30 inches by 30 inches [CMC 304.4.3].
  - **Lighting and Convenience Outlet**. A permanent 120 v receptacle outlet and a luminaire shall be installed near the appliance. The switch controlling the luminaire shall be located at the entrance to the passageway. [CMC 304.4.4].
- **Combustible floors and clearances.** Central heating furnaces to be installed on floors of combustible construction must be listed for that purpose [CMC 904.3]. Central heating furnaces shall have clearances from other materials in accordance with their listings, the manufacturer's installation instructions, and CMC 904.2.

- ❑ **Accessibility for Service.** Sufficient clearance shall be maintained to permit cleaning of equipment and replacement of filters, vent connections, and other components. A minimum working space of 30 inches in all dimensions shall be provided to this end. [CMC 304.1]

- ❑ **Anchorage.** Securely fasten appliances in place in accordance with manufacturer's installation instructions [CMC 303.4].

- ❑ **Air.**
  - **Air Filters.** Air heating systems require filters [CMC 311.2].
  - **Prohibited Sources.** Outside or return air for a heating system shall not be taken from a closet, bathroom, toilet room, kitchen, or rooms containing fuel-burning appliances. Outside or return air shall also not be taken from within 10 feet of an appliance or plumbing drainage vent, the discharge outlet of an exhaust fan (unless the outlet is 3 feet above the outside-air inlet), or above the surface of an abutting public way, sidewalk, street, alley, or driveway. [CMC 311.3]
  - **Return-Air Limitations.** Return air from one dwelling unit shall not discharge into another dwelling unit through the heating or cooling air system [CMC 311.4].
  - **Combustion air and Venting.** Shall be in accordance with the manufacturer's installation instructions or the requirements of CMC Chapter 7 and 8, respectively.

- ❑ **Condensate.** Equipment that produces condensate shall collect and discharge it to an approved location [CMC 310.1].
  - Condensate waste piping must be sized and provided with cleanouts so as to comply with CMC 310.3.
  - Use of condensate pumps requires approval, and where approved they must be installed in accordance with manufacturer's installation instruction and be interlocked in compliance with CMC 310.1.1.
  - Where equipment is installed in a space where damage could result from condensate overflow, a drain line shall be provided and an additional, secondary, method of protection compliant with CMC 310.2 shall be provided.

- ❑ **Ducts.**
  - **Size.** Residential ducts shall be sized in accordance with ACCA Manual D, ACCA Manual Zr, as applicable, or by other approved standards [CMC 601.2 Exc.].
  - **Location.**
    - **Protection.** Non-plastic air ducts must have not less than 4 inches separation from earth and be protected from physical damage [CMC 603.1.3].
    - **Under Floor or Crawl Space.** Air ducts installed under a floor or crawl space shall not prevent access to any area of the crawl space and, where it is necessary to move under ducts for access to areas of the crawl space, a vertical clearance of not less than 18 inches shall be provided [CMC 603.2].

- **Materials.**
  - **Metallic ducts.** Shall comply with *SMACNA HVAC Duct Construction Standards – Metal and Flexible* [CMC 602.3].
    - **Support.** Support metallic ducts at each change of direction and in accordance with SMACNA standards. Riser ducts shall be held in place by means of metal straps or angles and channels to secure riser to the structure. [CMC 603.3]
    - **Circular bands.** Ducts shall be equipped with tight-fitting circular bands extending around the entire perimeter of the duct. These circular bands must be at least 1 inch wide, at least as thick as the equivalent gauge of the duct material, and provided with a means of connecting to the suspending support [CMC 603.7.1.3 – 603.7.1.5].
      - **Exception.** Ducts not more than 10 inches in diameter may be supported with No. 18 gauge galvanized steel wire.
  - **Flexible Air Ducts.** Shall comply with UL 181, and shall be installed in accordance with the manufacturer's installation instructions and *SMACNA HVAC Duct Construction Standards – Metal and Flexible* [CMC 603.4]. They must be installed using the minimum required length to make connections, supported at not more than 4 feet intervals for horizontal runs or 6 feet intervals for vertical runs, with no more than ½ inch of sag per foot of length between supports, with bends not less than one duct diameter in radius, as well as additional requirements to be found in CMC 603.4.
    - **Prohibited uses.** Flexible air ducts may not be used for vertical risers in air-duct systems serving more than two stories, and may not penetrate fire-resistance rated construction [CMC 603.1.4, 603.1.5]
  - **Nonmetallic ducts.** Shall comply with the applicable sections of CMC 602.4.
- **Joints and Seams.** Shall comply with *SMACNA HVAC Duct Construction Standards – Metal and Flexible* and be made substantially airtight by means of tapes, mastics, gasketing, or other means. Crimp joints for round ducts shall have a contact lap of not less than 1 ½ inches and be mechanically fastened with not less than three sheet-metal screws equally spaced around the joint [CMC 603.9].
  - **Closure Systems.** For flexible air ducts (or other ducts listed and labeled to UL 181), joints and seams shall be in accordance with manufacturer's installation instructions. Closure systems for sealing air ducts shall be listed in accordance with either UL 181A for rigid metallic or fiberglass ducts, or UL 181B, for flexible air ducts [CMC 603.9.1].
- **Insulation.** New ducts in unconditioned spaces must be equipped with R-8 insulation.

❑ **Electrical.**
- **Circuits.** Central heating equipment must be supplied by an individual branch circuit [CEC 422.12]. This circuit must be sized not smaller than 125% of the load [CEC 424.4(B)].
  - **Exception:** Auxiliary equipment, such as a pump, valve, humidifier, or electrostatic air cleaner directly associated with the heating equipment as well as permanently connected air-conditioning equipment are permitted to share this branch circuit.
- **Disconnect.** An approved disconnecting means must be installed on the electric supply adjacent to and in sight from the furnace [CEC 424.19].
- **Service Outlet.** A 125v, 15- or 20-amp receptacle outlet must be installed at an accessible location within 25 feet of the heating equipment [CEC 210.63]. The receptacle shall be located on the same level as the heating equipment and shall not be connected to the load side of the equipment's branch circuit disconnecting means [CEC 210.63(A)].

❑ **Gas.**
- **Sizing.** It is the responsibility of the installer to verify that the new or existing gas supply is correctly sized before installation. Refer to the separate handout *Natural Gas Piping* for additional information.
- **Connections.** Gas connections to building piping must comply with CMC 1312.0.
  - **Flexible gas connectors.** Where used, connectors listed as in compliance with CSA Z21.24 shall be used in accordance with the manufacturer's installation instructions and shall be in the same room as the appliance [CMC 1312.1(3)].

- **Gas Shut-off Device.** An approved Seismic Gas Shut-off Device (motion sensitive) or an approved Excess Flow Gas Shut-off Device (non-motion sensitive) shall be installed downstream of the gas utility meter (after PG&E service tee), but upstream of any appliances, when altering or adding to the existing gas system. These devices shall be sized and installed per the manufacturer's installation instructions. [MMC II-170]

"California Valve"

❑ **Energy Compliance.** Installation of new or replacement of existing air heating equipment must comply with all applicable mandatory measures of the California Energy Code.

- Register your project with CalCERTS or CHEERS registry immediately and complete all compliance steps prior to final inspection.

3. ADDITIONAL REQUIREMENTS

❑ **Smoke/Carbon Monoxide Alarms and Spark Arrestor Inspection.** In all one- and two-family residences, installation and inspection of required smoke alarms, carbon monoxide alarms, and spark arresters must be completed prior to the final inspection. Refer to the *Smoke Alarm, Carbon Monoxide Alarm, and Spark Arrester Certificate* handout for detailed information.

❑ **Water Conserving Fixture Inspection.** All one- and two- family residences must have replaced all non-compliant plumbing fixtures with water-conserving plumbing fixtures and verification of this is required as a condition of final approval of any permit [CA Civ Code § 1101]. Refer to the *Water Conserving Certificate of Compliance* handout for details and exceptions.

4. INSPECTION PROCEDURES

❑ A rough inspection shall be scheduled if any work is inside walls or ceilings and will be covered with finish materials. A final inspection shall be scheduled after all work is complete including CalCERTS or CHEERS registry compliance.

5. QUESTIONS – If you have any questions regarding your project, please contact the Office of Building Safety at (408) 586-3240.