

RESIDENTIAL MECHANICAL AND FIREPLACE HANDOUT

- This handout is intended only as a guide. It shall not be considered a complete set of requirements.
- Materials and installation must comply with the current Minnesota State Mechanical and Fuel Gas Codes, and the manufacturers' installation specifications for each product.
- A new or replacement appliance requires a mechanical permit if a new or reconfigured gas line and/or new or reconfigured venting is required. Examples of appliances include furnaces, boilers, cooling equipment (portable or window units excluded), geothermal equipment, fireplace units (non-masonry only, masonry fireplaces require a building permit), water heaters, in-floor heat, air exchangers, unit heaters and dryers, kitchen and bathroom exhaust vents. The installation, replacement or reconfiguration of a gas line also requires a mechanical permit.
- Multiple appliances may be included on the same mechanical permit, if they will be ready for inspection at the same time.
- The following items do NOT need a mechanical permit UNLESS there is a gas line or venting involved as described above: Microwaves, electric stoves, refrigerators, freezers, space heaters, electric dryers, or countertop appliances. (Note: if the appliance is to be hard-wired an electrical permit is required.) (This is not an exhaustive list – for questions about whether a permit is required, call 952-442-7520.
- The manufacturer's installation and specification manual must be available at all inspections. Exhaust vent clearances at the exterior of the structure shall be in compliance with manufacturer's specifications.

PERMIT CARD (throughout the project) shall be:

POSTED prior to start of work - **VISIBLE** from street or driveway - **ACCESSIBLE** to the inspector

INSPECTION REQUIREMENTS:

Inspections **MUST** be scheduled during office hours **AT LEAST** one business day prior to inspection. If a specific date and time is required, additional notice may be needed. Failure to cancel a scheduled inspection may result in a reinspection fee.

- **Office Hours:** Monday - Friday • 8:00 a.m. - 4:30 p.m.
- **Phone:** (952) 442-7520 or (888) 446-1801

Inspections (required inspections are dependent on the project type):

- **Someone 18 years or older must be present at the time of the inspection.**
- **Mechanical rough-in:** After all the supply/return air ducts and bath/kitchen fans and vents are installed (if applicable). No work shall be covered until the rough-in inspection is approved. The manufacturer's installation instructions **MUST** be on site at the rough-in inspection. (NO rough-in inspection is required for projects such as a furnace or air conditioner replacement.)
- **Gas Line Air Test:** A gas line air test is required on all newly installed gas lines when all the gas lines are installed, gas lines are capped off, and the air test is on the system line.
 - ✓ Test pressure shall be no less than one and one-half times the proposed maximum working pressure, but not less than 25 psi irrespective of design pressure.
 - ✓ Test pressure shall be within the middle 50% of the test gauge pressure range, marked in 2 psi increments.
 - ✓ Test duration shall not be less than 30 minutes for residential gas lines.
- **Mechanical final:** After all mechanical equipment is installed; supply/return air grilles are operational and running; HRV or ERV is balanced; the bath/kitchen exhaust fan(s) are operational; and all intake and exhaust piping is complete. Manufacturer's installation instructions **MUST** be on site. For all new or replacement gas-fired furnaces and boilers, a completed Certification of Testing of Fuel Gas-Fired Heating Equipment (ORSAT) is required (attached). Test results must meet the minimum requirements of Chapter 9 of the current MN Fuel Gas Code. Test results shall be provided to the inspector and posted on the appliance at the time of the final inspection.

- **Gas line/fitting leak test:** A gas line fitting/leak test is required on all newly installed gas lines after all work is complete. You may perform a leak test on site at the time of the final inspection, or provide a completed Certification of Final Testing on Gas Line and Fittings form (attached) at the time of the final inspection. The test shall be by means of an approved combustible gas detector, manometer, a noncorrosive leak detection fluid, or an equivalent nonflammable solution.

NOTICE: Construction or work for which a permit is required shall be subject to inspection by the Building Official, and such **construction or work shall remain accessible and exposed for inspection purposes until approved.** It is the responsibility of the permit applicant to be in attendance on site and provide access to the Building Official for all required inspections. If work is concealed and/or work is not complete at time of inspection, an additional inspection is required and a **reinspection fee may apply.**

Note: The State of Minnesota requires all residential building contractors, remodelers, roofers, plumbers, and electricians to obtain a state license, unless they qualify for a specific exemption. Any person claiming an exemption must provide a copy of a Certificate of Exemption from the Department of Labor & Industry to the Municipality before a permit will be issued.

Note: To determine contractor requirements, or to check the licensing status of a contractor, please call the Minnesota Department of Labor & Industry at 651-284-5065 or toll free 1-800-342-5354.

Note: For specific code requirements, contact the Building Inspection Department at 952-442-7520 or 888-446-1801 or e-mail: info@mnspect.com.

PROJECT CHECKLIST:

The following is a guideline to assist in compliance with the requirements of the MN State Building Code.

BATHROOMS:

- The required bathroom ventilation rate for toilet, shower/bath, and similar rooms is 50 cubic feet per minute (cfm) intermittent or 20 cfm continuous. Bathroom ventilation requirements can also be met by installing an operable window, in which case the minimum openable area to the outdoors shall be a minimum of 1.5 sf.

BATH FANS:

- Ducting material must be an approved material. Flexible duct is allowed but must be listed and labeled class 0 or class 1 duct that is tested in accordance with UL 181.
- Termination of exhaust ducting must be at least 3' from openings into the building (such as non-mechanical air intakes, windows, and doors).
- Exhaust fans must discharge outdoors. Termination must be equipped with a backdraft damper. (This is in addition to the damper at the fan.) Air must not be exhausted into the attic or crawl space.
- Insulation with a thermal resistance of R-3.3 and a vapor retarder with all joints sealed is required 3' back from the exterior wall/roof sheathing on exhaust ducting inside conditioned space, and continuous in attics/unconditioned space. Insulation and vapor retarder are required from the exterior wall or roof sheathing to 3 feet into a conditioned space. In unconditioned spaces, the insulation and vapor barrier shall be continuous and extend to a conditioned space. The insulation shall be a minimum of R-3.3 and the vapor barrier shall have lapped and taped seams.

VENTILATION OF UNINHABITED SPACE:

- Conditioned crawl spaces require mechanical ventilation of .02 cfm per square foot or a minimum 1 supply and 1 return duct. This ventilation may be provided by a supply duct or a mechanical fan and humidistat. Supply and return must be separated by one half of the diagonal room dimension.
- Unconditioned crawl spaces shall be ventilated per Section 408 of the Minnesota Residential Code.

DRYER VENT: (MN Mechanical Code 913, 504.4)

- Exhaust vents for clothes dryers shall be constructed of metal and have a smooth interior finish.
- The duct shall be a minimum size of 4".
- The maximum length shall not exceed 35' with a deduction of 5' for each 90-degree elbow (may use specific requirements provided by dryer manufacturer).
- No screws or rivets that penetrate more than 1/8" into the duct may be used to secure the duct. Dryer duct must be secured in place; joints are to be sealed with tape or other approved material found in MMC 603.9. Tape should be marked 181 B-FX.
- Each vertical riser shall be provided with a means for cleanout.
- Male ends of joints shall extend in the direction of airflow.
- Transition ducts may be used to connect the appliance but must not be concealed or exceed 8' in length and must be tested and labeled in accordance with UL 2158A.
- Dryer duct must terminate on the outside of the building and shall be equipped with a backdraft damper

(screens on discharge are not allowed).

- Installations exhausting more than 200 cfm shall be provided with makeup air.

SUPPLY DUCTING:

- Supply duct sizing considerations include heat loss due to room size, exterior walls and floors, window and door openings to the exterior and distance from the furnace.
- A supply duct is required in all habitable spaces not provided with natural ventilation as required by MRC 303.1 and MMC 401.2.; bathrooms, closets and storage areas may not require supplies but may require ventilation.

RETURN DUCTING:

- A return path for air back to furnace is required for the supplies to work correctly. A door restricts this path if a room does not have a return duct. For each cubic foot of air delivered to a space, a return path to the furnace is required.
- Return ducts are not allowed in kitchens, bathrooms, toilet rooms, closets, garages, furnace rooms, boiler rooms or unconditioned attics– all other habitable spaces require a return path to the furnace.
- Return ducts shall not be located within 10' in any direction from an open combustion chamber or draft hood of another appliance.
- Return outlets are typically located in interior walls.
- Return ducts are to be sized in accordance with ACCA Manual D, the manufacturer's instructions or the design of a registered design professional.
- Building framing cavities shall not be used as ducts or plenums.

DUCT CONSTRUCTION SPECIFICS:

- Approved supply ducts may be constructed of metal, fibrous glass or flexible air ducts, either metallic or nonmetallic. Flexible duct, both metallic and nonmetallic shall be tested in accordance with UL 181 and shall be listed and labeled as Class 0 or Class 1. (Labels must be attached to ducts and visible at the time of inspection.) Return ducts may use the above materials. Construction is required to be substantially airtight.

Note: The conversion or alteration of existing spaces may require additional combustion and/or makeup air and verification of proper operation.

DUCTS OUTSIDE CONDITIONED SPACE: (Code Reference)

- All ducts shall be sealed (MN Energy Code R403.2.2).
- A pressure test (25 pascals) is required on all duct systems that leave the building's thermal envelope.
- 1322MN Energy Code.R403.2.1: All exhaust, supply and return air ducts and plenums shall be insulated according to

TABLE R403.2.1 MINIMUM REQUIRED DUCT AND PLENUM INSULATION FOR DWELLING UNITS

DUCT TYPE/LOCATION	REQUIREMENTS
Exterior of building	R-8, V, and W
Attics, garages and ventilated crawl spaces	R-8 and V

V means the vapor retarder in accordance with IMC Section 604.11. When a vapor retarder is required, duct insulation required by this section shall be installed without respect to other building envelope insulation.

W means an approved weatherproof barrier.

FIREPLACES – FACTORY BUILT (Masonry fireplaces require a building permit.):

- The installation of a gas fireplace requires a separate permit. This permit should include the fireplace and the associated gas line to this appliance only. Installation of the fireplace and gas line (with pressure test) is required at the rough-in inspection.
- The unit shall comply with UL 127, the hearth with UL1618 and the installation must conform to manufacturer's instructions (which must be available at the time of inspection).
- It is strongly advised that instructions be read and understood before installation of fireplace begins. Most inspection failures are as a result of not reading or understanding the instructions. Manufacturer's installation instructions must be onsite at all inspections.
- Outside wall construction should be weather-tight and complete before the appliance is set.

- At the time of the rough-in inspection, the appliance must be set and vented; in addition, framing, draft, and fire stopping must be installed and accessible. The rough-in inspection is required prior to installation of drywall or plywood.

GAS PIPING:

- Gas piping to the appliance should be installed and visible at the time of the rough-in inspection of the fireplace.
- Gas piping must be of approved materials and installation methods.
- Corrugated Stainless Steel Tubing (CSST) installations must follow manufacturer's installation instructions for the specific brand of CSST installed.
- CSST installations require a qualified installer. (Certification is available to homeowners.)
- CSST installation also requires bonding as detailed in the specific manufacturer's installation instructions.
- A 25# air pressure test is required on all newly installed gas lines before final connection to the house gas distribution system. This can be achieved by closing gas valves and/or capping and isolating the line from the house gas supply and the appliance regulator. (Under no circumstances should pressure be applied to the appliance regulator or the house distribution system.)
- At the final inspection all finish materials must be installed including mantel and surrounds, the gas line connected, and all applicable related electrical inspected and approved (if applicable). The manufacturer's installation instructions must be available at the final inspection.

Certification of Final Testing on Gas Line and Fittings

(This form must be completed and provided to the inspector at final inspection of all newly installed gas lines and/or fittings.)

PERMIT NUMBER: _____ Date of Work Completion: _____

Site Address: _____

Municipality: _____

Company/Installer Name: _____

Describe the Scope of Work Performed

Be specific – include what work was performed, the appliance being serviced, what new components were installed (i.e. gas line, fittings, shut-off valves), and the type of material (i.e. black iron, copper, corrugated stainless steel, plastic). Attach additional sheet(s) if needed:

Type of Approved Test Performed: _____

I certify that on _____
(Date)
the above-stated approved test was completed in accordance with Section 406 of the MN Fuel Gas Code, that all work was completed prior to the test, and that no leaks were detected upon completion of the test.

(Signature of Certifying Individual)

(Certification Date)

(Printed Name)

Certification of Testing of Fuel Gas-Fired Heating Equipment

(This form must be completed and provided to the inspector at final inspection of all gas-fired furnaces and boilers.)

PERMIT NUMBER: _____ Date of Test Completion: _____

Site Address: _____

Municipality: _____

Company/Installer Name: _____

ORSAT Test Results						
Atmospheric			Induced Draft/Fan-Assisted		Power Type	
Item	Code Req.	Actual	Code Req.	Actual	Code Req.	Actual
Efficiency	≥ 75 %		≥ 75 %		≥ 80 %	
CO level	≤ .04%		≤ .04%		≤ .04%	
Stack Temp	≤ 480° F		≤ 480° F		≤ 480° F + ambient OR	
					≤ 125° F in excess of fluid Temp + ambient	
CO2 level	Between 6-9%		Between 6-9%		Between 6-9%	
Oxygen level	Between 4-10%		Between 4-10%		Between 3-10%	

I certify that on _____^(Date) the above-stated approved test was completed in accordance with Section 1346.5900 of the MN Fuel Gas Code, that all work was completed prior to the test and that the fuel gas-fired equipment meets the performance standards for the type of equipment.

- A copy of the test results along with the installer's name and test date must be affixed to the appliance.

(Signature of Certifying Individual)

(Certification Date)

(Printed Name)