

Direct Vent Boilers

A direct vent boiler is one that has sealed combustion. All combustion air is drawn directly from outdoors. All products of combustion are vented directly to outdoors. These units are very efficient. Many are condensing type units (efficiency over 90%). That means that the moisture in the products of combustion condenses in the boiler and flue. The exhaust temperature is normally about 130F. They are typically vented out a side wall. Various manufacturer's have similar venting requirements.

The venting recommendations are typically

1. 1' above grade (but the instructions also state 1' above the snow line)
2. 1' horizontally from an operable window. 1' above a window.
3. 1' above a door (but condensing boilers exhaust saturated vapor that often creates ice).
4. IFGC 503.8 (2) "...shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard .." "Where local experience indicates that condensate is a problem with category I or III appliance, this provision shall also apply." I believe that a 4' buffer (planter or overhang under the vent) from the building is sufficient.
5. IFGC 503.8 (3) "A mechanical draft venting system shall terminate at least 3' above any forced air inlet located within 10'.

The Boiler Division has received many complaints about the products of combustion being a nuisance to adjoining units within buildings or from neighbors. The new code is silent on many issues. My recommendations are as follows:

1. 2' above grade minimum and 7' above a private walkway or driveway.
2. 4' minimum horizontally from an operable window.
3. Not permitted above a door.
4. 4' buffer from a public walkway (venting over a 4' overhang is acceptable).
5. 3' above any forced air inlet within 10'
6. Maximum of 350,000 btuh sidewall venting within 10' radius except from rooftop penthouses.
7. 2' from an inside corner of buildings.
8. 4' from the underside of an overhanging terrace.
9. 2' minimum from a roof overhang, but at least the width of the overhang.
10. Courtyards on a case by case basis. Narrow walkways (3' wide) with operable windows are common. Air shafts are being used for supply/exhaust air. Courtyards must a minimum of 20' wide.
11. DOB approval does not guarantee a neighbor will not complain about a nuisance. The owner may be forced to extend vents to the roof if a nuisance is found.

Direct Vent Devices

The use of direct vent boilers and hot water heaters has risen exponentially. They are compact, reliable and can achieve very high efficiency. Most of the devices installed in the past had an efficiency of about 80%. The minimum in the current energy code is 75-83% depending on the fuel and application. Direct vent condensing type units can achieve well over 90% in many applications. The increase is due to designing the system to be able to extract heat from the flue gas below 140F. The water vapor in the products of combustion is condensed and a large amount of the heat of vaporization is put to use. There are some problems that inspectors continue to note. They range from nuisances to potential dangerous conditions. This memo has been written to address these concerns. The goal is to issue clear directions to industry.

The newly adopted fuel gas code applies to the installation of fuel-gas piping systems, fuel-gas utilization equipment and related accessories. It provides some very basic guidance for direct vent appliances.

FGC 303.3: Appliance locations – Prohibited locations – the only limitation under exceptions for direct-vent appliances is in rooms used for sleeping purposes. This would therefore prohibit use in a studio apartment. The question is whether they are permitted in a closet with a sleeping room. Recommendation: They should be permitted in a closet within a sleeping room that has a one hour fire rating, self closing door, and carbon monoxide detector in the sleeping room.

FGC 503.8 Venting system termination location (1) exception: “Direct vent appliances approved by the commissioner and installed in accordance with the manufacturer’s instructions.” (2) “Where permitted, through-the-wall vents for Category II and IV appliances and non-categorized condensing appliances shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard...” “Where local experience indicates that condensate is a problem with Category I and III appliances, this provision shall also apply.” Design professionals have submitted plans with devices having heat input over one million btuh venting out sidewalls. The manufacturer’s installation manual permits the discharge under or next to operable windows. Re-entrainment of the products of combustion often causes nuisance complaints.

Recommendations:

Limit the venting to devices that have a maximum total input of 350,000 btuh within a ten foot radius. Sidewall vents from unoccupied rooftop penthouses may be of any size provided they are 7’ above the roof line.

The vents may not terminate over any public walkway. A four foot buffer is sufficient from the walkway.

The vent may not terminate over any exit door to avoid icing at an egress.

FGC 631.2 Boilers – Installation – “In addition to the requirements of this code, the installation of boilers shall be in accordance with the manufacturer’s instructions and the New York City Mechanical Code.” MC 101.2 states “The installation of fuel gas distribution piping and equipment, fuel gas fired appliances and fuel gas fired appliance venting systems shall be regulated by the New York City Fuel Gas Code.” The conflict appears to make the requirements only for venting apply to one code and not both.

Recommendations: Follow the requirements of MC 804.3.4 for gas fired devices

1. “Where located adjacent to walkways, the termination of mechanical draft systems shall be not less than 7 feet (2134 mm) above the level of the walkway.” Public walkways are already covered under FGC 503.8. Private walkways should include driveways.
2. “Vents shall terminate at least 3 feet (914 mm) above any forced air inlet located within 10 feet (3048 mm).”

3. "The vent system shall terminate at least 4 feet (1219 mm) below, 4 feet (1219 mm) horizontally from or 1 foot above any door, window or gravity air inlet into the building." Many manufacturer's require only 1' horizontally and 1' below a window for venting.
4. "The vent termination point shall not be located closer than 3 feet (914 mm) to an interior corner formed by two walls perpendicular to each other."
5. "The vent termination shall not be mounted directly above or within 3 feet (914 mm) horizontally from any gas or electric metering, regulating, venting relief equipment or other building opening."
6. "The bottom of the vent termination shall be located at least 24 inches (610 mm) above finished grade." Several manufacturers require the termination to be at least 12" above the snow line. No definition of the snow line has been written. For those cases, 3 feet above grade is recommended.
7. Sidewall venting into a closed court or alleyway is not recommended. Site specific approval is required to minimize the possibility nuisance complaints.