

STATE OF NEW HAMPSHIRE DEPARTMENT OF SAFETY

John J. Barthelmes, Commissioner



Division of Fire Safety
OFFICE OF THE STATE FIRE MARSHAL
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Informational Bulletin 2016-01
PVC Technical Bulletin (NFPA 54 - 12.5.3 Amendment)

This Technical Bulletin is designed to clarify the recent amendment to NFPA 54 (2009) Section 12.5.3. The New Hampshire Board of Fire Control has amended this section of the National Fuel Gas Code – 2009, Section 12.5.3 to read as follows;

12.5.3 Plastic Vent Joints. Plastic piping and fittings used to vent appliances shall be installed in accordance with the appliance manufacturer’s installation instructions, provided the maximum set point of a fixed or adjustable, water and/or flue gas, high limit setting of the appliance, does not exceed the safe operating temperature of the venting material selected. Where primer is required, it shall be of a contrasting color.

This amendment language became effective on January 1, 2016 and requires installers of category IV venting systems to select their venting materials based on the set point of a high limit and how it affects the exhaust gas temperatures. This document, along with the amendment language change, should be used in conjunction with the venting material recommendations from the appliance manufacturer.

The change in NFPA 54 (2009) section 12.5.3 is intended to require licensed NH fuel gas fitters to select a venting material that will be resilient enough to withstand temperature ranges that the appliance may produce. This requirement is **not** intended to recommend one type of venting material over another. Nor should this language be intended to mandate the use of one particular brand of venting material over another, such as polypropylene or stainless steel venting systems.

To be clear; neither the NH State Fire Marshal’s Office, or the NH Mechanical Licensing Board, has banned the use of PVC or CPVC as an approved venting material.

Upon investigation and the study of category IV venting; it was concluded that certain types of venting systems recommended by the appliance manufacturer can fail when exposed to periods of operation outside the parameters of the safe operating temperature of the venting material in use. Several causes were identified as contributing factors for these types of failures. They were identified as:

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PVC TECHNICAL BULLETIN - Page 2 of 4

- Failure of the installer to vent the appliance in accordance with the manufacturers installation instructions
- Improper fuel system conversion of the appliance
- Improper final adjustments and testing of the appliance as prescribed by the manufacturer's installation instructions
- Improper selection of a venting material when compared to the operating instructions of the appliance
- Improper preparation of the venting materials to the joints; including the selection and use of the proper primer and adhesives as specified by the installation instructions and the National Fuel Gas Code (NFPA 54, 2009).
- Lack of consumer education with respect to the appliance operation and required maintenance when a new appliance is placed into service
- Adjustments made to the limit settings of appliances that exceeded the safe operating temperature of the venting material installed
- Lack of routine or proper regularly scheduled maintenance as prescribe by the appliance manufacturer

While each item above has a significant outcome with respect to the safe operation of a fuel gas fired appliance, any combination of them can cause catastrophic failure and serious risk of injury to the occupant, residents, or property owners.

Category IV or condensing appliances are designed to operate within specific temperature parameters. When these appliances operate within their respective settings, the exhaust gas temperature should not exceed the safe operating temperature of most types of venting material. Each one of these materials has specific limitations where they can be safely used. When an exhaust gas temperature operates beyond the safe temperature limit of the venting material, it can degrade, warp and/or fail posing the risk for deadly carbon monoxide gas to be released into the building. Installers must be aware of the temperature limitations of each type of venting material in order to select the best material for the appliance being installed. Commonly these materials have specific temperature limitations. The items listed below represent an average maximum temperature. Installers should verify that the material they intend to use is adequate for the temperature range of the appliance. Common maximum temperatures are:

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PVC TECHNICAL BULLETIN - Page 3 of 4

- PVC commonly has a maximum safe temperature of 145 degrees F.
- CPVC commonly has a safe operating temperature of 190 degrees F
- Polypropylene commonly has a safe operating temperature of 245 degrees F
- Stainless Steel commonly has a safe operating temperature of 480degrees F

Often times licensed fuel gas service technicians will be called to perform regularly scheduled service and/or maintenance on a natural gas or propane fired appliance. Technicians need to carefully examine the existing venting system regardless of the type or style of materials in place. ALL venting systems can fail when they are not properly inspected, cleaned or maintained. PVC systems can fail sooner than metal vent systems when they are exposed to periods of high temperatures. These failures usually present themselves as:

- A change in the color of the PVC piping to a dull white, purple or brown
- Warping, soft spots, or any deformity of the PVC vent piping (broken hangers)
- Stress cracks or brittle PVC vent pipe
- Loose or separated vent pipe joints

Technicians need to be advised that the National Fuel Gas Code (NFPA 54, 2009) is not a retroactive code. Meaning that the mere presence of PVC piping on a fuel gas fired appliance is not cause for immediate replacement. One needs to properly investigate and make an informative decision regarding the condition of the venting material before replacement is advised or warranted. Should evidence of any of the items above present itself during routine or emergency maintenance, technicians should then follow the revised section of 12.5.3 and install a more resilient venting system.

No vent system should ever be left in operation that demonstrates a risk to safety of the occupants or property owners. For additional information regarding removing an appliance from service, please consult the local Fire Department, or the NH State Fire Marshal's Office.

Never leave a fuel gas fired appliance in operation with a failing vent system.

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PVC TECHNICAL BULLETIN – Page 4 of 4

Never mix venting materials. PVC, CPVC and Polypropylene vents must be installed as a complete system. This includes any and all fittings, joints, or elbows. Technicians must make sure that they are using a primer of contrasting color as required by section 12.5.3. Technicians need to ensure that the adhesives they use have the proper listing for the type of venting material installed

Technicians must also research the type and brand of fuel gas fired equipment they plan to install. For example; a common fan assisted natural gas fired hot water heater may have a maximum set point of 140°F, yet the safety control is factory set at 150°F. The installer would then have to use a venting system that would be resilient enough to withstand the maximum set point, requiring either a CPVC stainless steel, or polypropylene system. The same application would be true for high efficiency boilers that have set points ranging to 200°F or above. The vent system would now need to withstand those settings should the heater exchanger become plugged or the burner malfunctions.

In general many warm air furnaces have fixed limit set points below 150 degrees F. As such, many category IV high efficiency warm air furnaces may continue to operate normally with a PVC vent system as their exhaust gas temperatures cannot exceed the temperature limits of PVC. With these types of appliances, there was little documented evidence of vent system failures. Installers and service technicians should become familiar with the products they are installing to determine the safe vent system installation.

The amended language in section 12.5.3 of the National Fuel Gas Code (NFPA 54, 2009) is intended for licensed fuel gas fitters, and installers to research and select a safe venting material that is resilient enough to withstand the failsafe operating limits of the fuel gas fired appliance that which they are replacing and/or installing. Nothing in this document should be interpreted as a prohibition on PVC and/or CPVC vent systems to be continued to be used in their proper application. Installers must now research and select the appropriate venting material.

For additional venting questions not found in the National Fuel Gas Code (NFPA 54, 2009), please contact the NH State Fire Marshal's Office at (603) 223-4314 or by email at mechanicalinfo@dos.nh.gov.

- 30 -