



**BUILD  
HENRICO**

[HENRICO.GOV/BUILD](https://henrico.gov/build)

# **Significant changes in the 2021 Virginia Residential Code**

**for**

**MECHANICAL/GAS/PLUMBING**

**HENRICO COUNTY**

Department of Building Construction and Inspections



**BUILD  
HENRICO**

HENRICO.GOV/BUILD



## Virginia Residential Code

- The Virginia Residential Code (VRC) combines the 2021 International Residential Code (IRC) and the 2021 Virginia amendments in one document
- The VRC is published by the International Code Council and is available from <https://codes.iccsafe.org/codes/virginia>



BUILD  
HENRICO

HENRICO.GOV/BUILD



## Marginal Markings within the VRC – Physical Books



- **DOUBLE vertical lines** in the margin within the body of the code indicates a **Virginia Amendment**



- **A single Solid vertical line** in the margin within the body of the code indicates a technical change from the requirements of the 2018 International Residential code.



- **Deletion indicators in the form of an arrow** are provided in the margin where an entire section, paragraph, exception or table has been deleted or an item in a list of items or a table has been deleted.



- **A single asterisk** [\*] placed in the margin indicates that text or a table has been relocated within the code.



- **A double asterisk** [\*\*] placed in the margin indicates that the text or table immediately following it has been relocated there from elsewhere in the code.

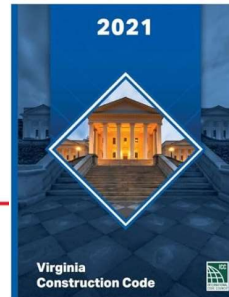


**BUILD  
HENRICO**

HENRICO.GOV/BUILD



+



=



## Virginia Residential Code

- The most impactful changes to plumbing, mechanical, and fuel gas requirements are being discussed. You are strongly encouraged to review the many other changes not included in this training.
- The Virginia amendments themselves can be found and are available from:  
<https://www.dhcd.virginia.gov/sites/default/files/DocX/building-codes-regulations/archive-codes/2021/2021-virginia-construction-code.pdf>



# BUILD HENRICO

[HENRICO.GOV/BUILD](http://HENRICO.GOV/BUILD)



## MECHANICAL



# Heating and Cooling Equipment

[HENRICO.GOV/BUILD](https://HENRICO.GOV/BUILD)

## Approved refrigerants M1411.1



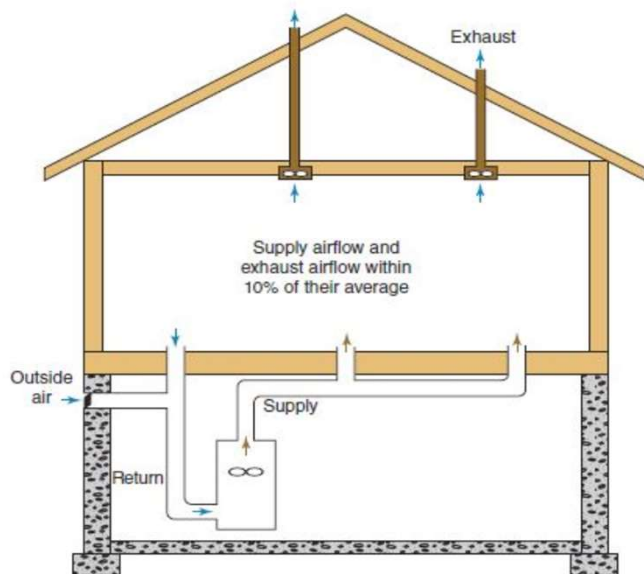
- Residential equipment – air conditioners and heat pumps manufactured after January 1, 2025, must use a new refrigerant type. Equipment manufactured prior to this date has a 1-year grace period to be installed.
- Code sections have been modified and added for the A2L refrigerants.

# Exhaust Systems

HENRICO.GOV/BUILD

## Mechanical ventilation rate M1505.4.3 Except. #1

- A 30% credit has been given, allowing airflow to be reduced when the Whole House Ventilation System supplies ventilation air to each bedroom as well as other specific locations and the system also requires balancing.
- See important Energy Efficiency requirements pertaining to Mechanical Ventilation Systems on slides **that follow.**



Balanced ventilation system



IMPORTANT REFERENCE TO CHAPTER 11 SLIDES

# Energy Efficiency

HENRICO.GOV/BUILD

## Duct Testing & Duct Leakage N1103.3.5, N1103.3.6



- Duct testing language has been modified and specific standards have been updated.
- Ducts that are **not integrated** with the **heating & cooling system** are exempt from testing.
- Ducts and systems that are entirely with-in the building thermal envelope **now** require duct leakage testing and are no longer exempt from testing.
- An additional testing option with limits on duct leakage has been added. When testing ducts entirely within the building thermal envelope - leakage shall be less than or equal to 8 cfm per 100 sq. ft. of conditioned floor area.





BUILD  
HENRICO

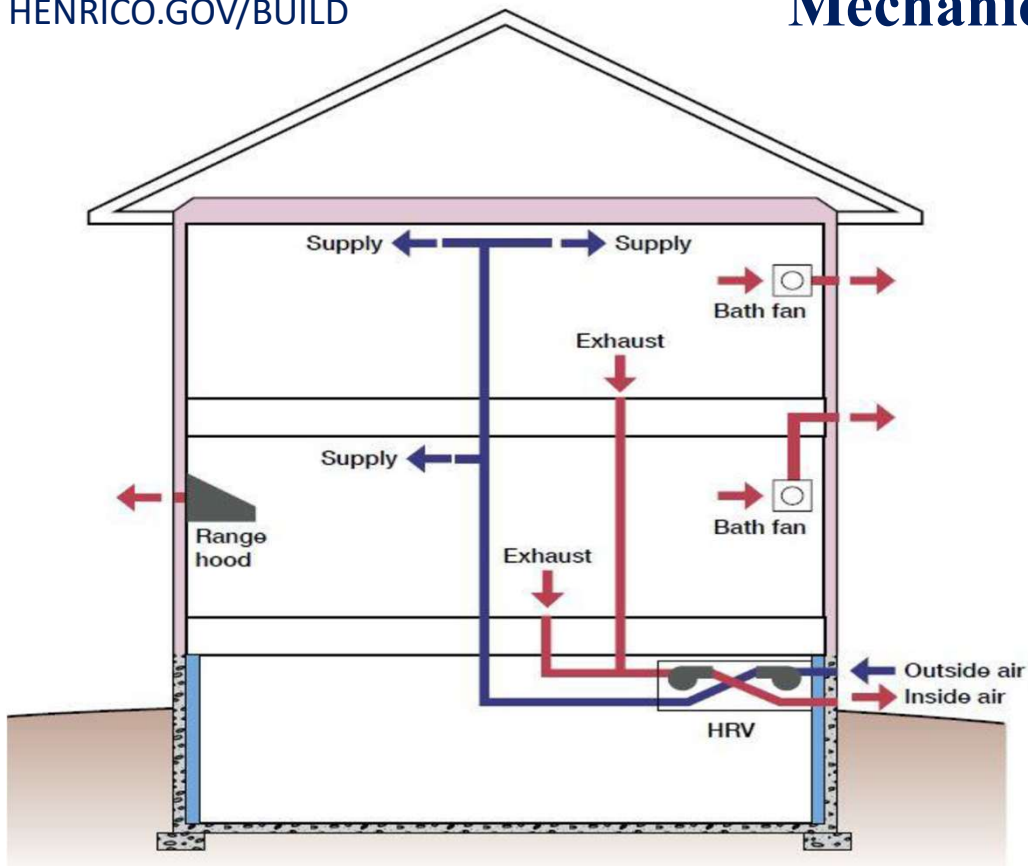
Chapter 11

# Energy Efficiency

HENRICO.GOV/BUILD

## Mechanical Ventilation System

### Fan Efficacy – N1103.6.2 Testing – N1103.6.3



- Mechanical ventilation systems are required to be tested according to equipment instructions or other airflow measuring devices. (Ex. Flow Hood)
- **A written report of the results shall be provided to the code official.**
- Fans used to provide whole-dwelling mechanical ventilation requirements shall meet specified efficacy ratings.
- Kitchen range hoods ducted to the outside with 6 inch or larger ducts with less than one 90-degree elbow are exempt.



BUILD  
HENRICO

Chapter 11

# Energy Efficiency

HENRICO.GOV/BUILD

## Duct tightness & Whole-dwelling ventilation Testing/Reporting

Note: This testing requirement was present in the 2018 VRC and has been **expanded** in the 2021 VRC.

### **When to test:**

- The code allows for duct tightness testing to occur at: Rough-in or post construction. It is the permit applicant's choice when to perform the required testing.

### **When to submit:**

- Submission of the Blower Door test, Duct tightness test & Whole-dwelling ventilation tests are the responsibility of the permit applicant. Timing is critical to prevent delays in processing (i.e. obtaining a certificate of occupancy). Duct tightness test and whole-dwelling test results need to be reviewed and approved for a Final Mechanical Inspection to be passed. Blower door test results need to be reviewed and approved for a Final Building Inspection to be passed. Test results need to clearly define what was tested and must include permit number.



## Chapter 11

# Energy Efficiency

HENRICO.GOV/BUILD

## Duct tightness & Whole-dwelling ventilation Reporting

### What and when to submit:

- Duct tightness test and whole house ventilation system test to be submitted when scheduling the Final Mechanical Inspection.
- Blower door test to be submitted when scheduling the Final Building Inspection.

### How to submit:

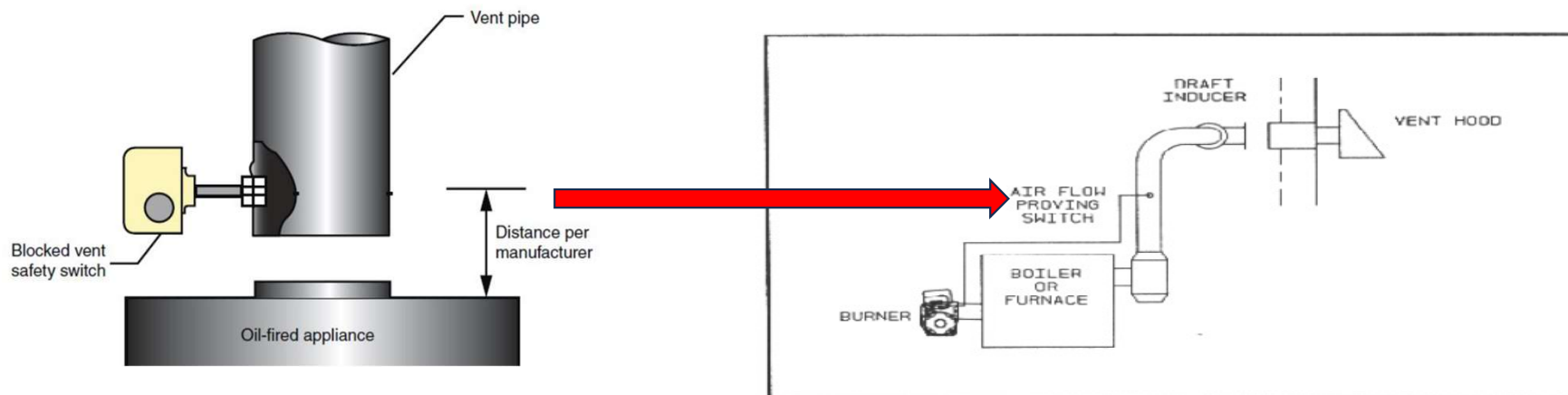
- For duct tightness and whole house ventilation systems, see the following video:  
<https://www.youtube.com/watch?v=dgeMbpRTbZc&feature=youtu.be>
- For blower door test, see the following video:  
<https://www.youtube.com/watch?v=dxAZx9cWMtE>

# Chimneys and Vents

HENRICO.GOV/BUILD

## Blocked vent switch M1802.4

- A device designed to stop burner operation if the venting system is obstructed is now required on boilers.
- Requires manual reset.
- Installed per manufacture's installation instructions.





# BUILD HENRICO

[HENRICO.GOV/BUILD](https://HENRICO.GOV/BUILD)



**FUEL GAS**



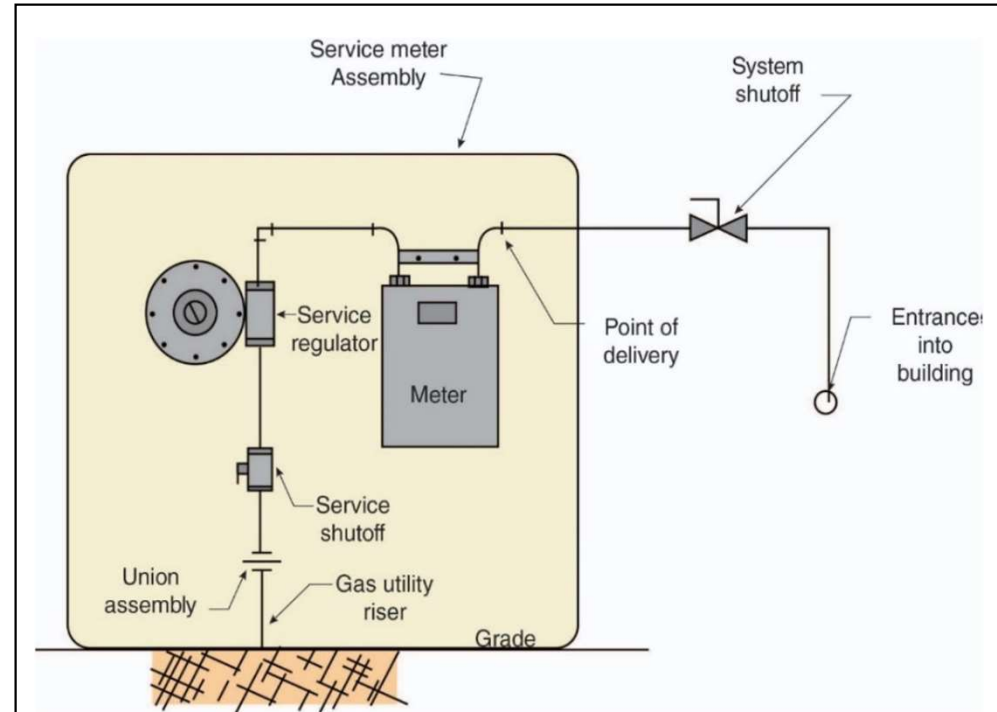


BUILD  
HENRICO

## Chapter 24

# Fuel Gas

HENRICO.GOV/BUILD





**BUILD  
HENRICO**

Chapter 24

# Fuel Gas

HENRICO.GOV/BUILD

## Threaded joint sealing G2414.8.3



- Section was revised to be all inclusive with multiple types on non-hardening materials available in the market.
- Joint compounds, pipe dope, pipe tape (“Teflon tape”)

## Fitting in concealed locations G2415.5



- Two additional types of fittings have been added to the list of approved in concealed locations.
- Caps and plugs are now approved for concealed locations.





**BUILD  
HENRICO**

## Chapter 24

# Fuel Gas

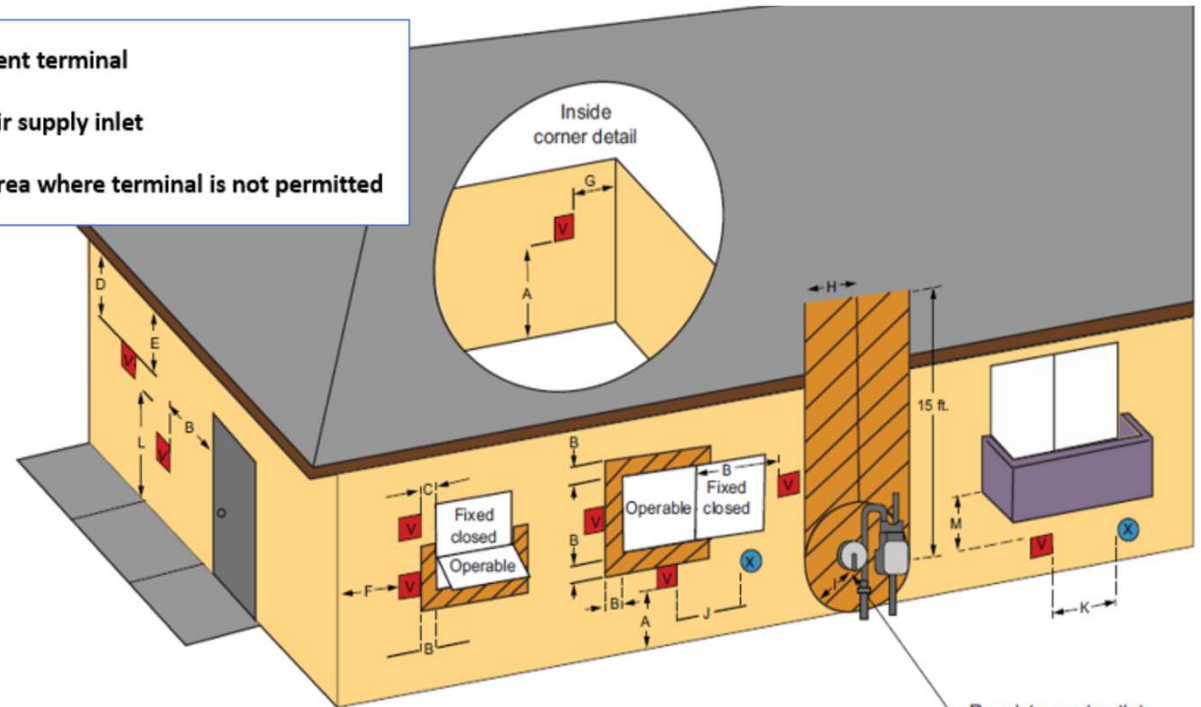
HENRICO.GOV/BUILD

## Venting system Terminal clearances G2427.8

TABLE 503.8  
THROUGH-THE-WALL VENT TERMINAL CLEARANCE

| FIGURE CLEARANCE | CLEARANCE LOCATION   | MINIMUM CLEARANCE FOR DIRECT-VENT TERMINALS  | MINIMUM CLEARANCE FOR NONDIRECT-VENT TERMINALS             |
|------------------|--|--|--|
| A                | Clearance above finished grade level, veranda, porch, deck, or balcony   | 12 inches  |  |
| B                | Clearance to window or door that is operable   | 6 inches: Appliances ≤ 10,000 Btu/hr   | 4 feet below or to side of opening or 1 foot above opening |
|                  |  | 9 inches: Appliances > 10,000 Btu/hr ≤ 50,000 Btu/hr   |  |
| C                | Clearance to nonoperable window  | 12 inches: Appliances > 50,000 Btu/hr ≤ 150,000 Btu/hr   | 4 feet below or to side of opening or 1 foot above opening |
|                  |  | Appliances > 150,000 Btu/hr, in accordance with the appliance manufacturer's instructions and not less than the clearances specified for nondirect-vent terminals in Row B             |  |
| D                | Clearance to nonoperable window  | None unless otherwise specified by the appliance manufacturer  |  |
| E                | Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the center line of the terminal | None unless otherwise specified by the appliance manufacturer  |  |
| F                | Clearance to unventilated soffit   | None unless otherwise specified by the appliance manufacturer  |  |
| G                | Clearance to outside corner of building  | None unless otherwise specified by the appliance manufacturer  |  |
| H                | Clearance to inside corner of building   | None unless otherwise specified by the appliance manufacturer  |  |
| I                | Clearance to each side of center line extended above regulator vent outlet   | 3 feet up to a height of 15 feet above the regulator vent outlet   |  |
| J                | Clearance to service regulator vent outlet in all directions   | 3 feet for gas pressures up to 2 psi; 10 feet for gas pressures above 2 psi  |  |
| K                | Clearance to nonmechanical air supply inlet to building and the combustion air inlet to any other appliance                                    | Same clearance as specified for Row B  |  |
| L                | Clearance to a mechanical air supply inlet   | 10 feet horizontally from inlet or 3 feet above inlet  |  |
| M                | Clearance above paved sidewalk or paved driveway located on public property  | 7 feet and shall not be located above public walkways or other areas where condensate or vapor can cause a nuisance or hazard  |  |
| N                | Clearance to underside of veranda, porch, deck, or balcony   | 12 inches where the area beneath the veranda, porch, deck or balcony is open on not less than two sides. The vent terminal is prohibited in this location where only one side is open. |  |

- V = Vent terminal
- X = Air supply inlet
- = Area where terminal is not permitted



**FIGURE G2427.8 (503.8)  
THROUGH-THE-WALL VENT TERMINAL CLEARANCE**

Regulator vent outlet. In the event no regulator is present, H and I can be disregarded.



## Chapter 24

# Fuel Gas

[HENRICO.GOV/BUILD](http://HENRICO.GOV/BUILD)

### **Venting system Terminal clearances G2427.8 (con't)**

- A new table has been created with an alphabetic legend to show the location of vent terminals and their clearances from building openings.
- A new figure has been created to illustrate the Through-The-Wall vent terminal location with the new corresponding table.
- The clearances in this table shall not apply to combustion air intakes of direct vented appliances.

## Prohibited Location G2447.2



- Commercial cooking appliances installed in dwelling units or domestic kitchens are once again prohibited.
- The exception that allowed commercial gas equipment to be installed in a residence for domestic use that met manufacturers installation requirements, and the design approval of a licensed Professional Engineer has been removed.



# BUILD HENRICO

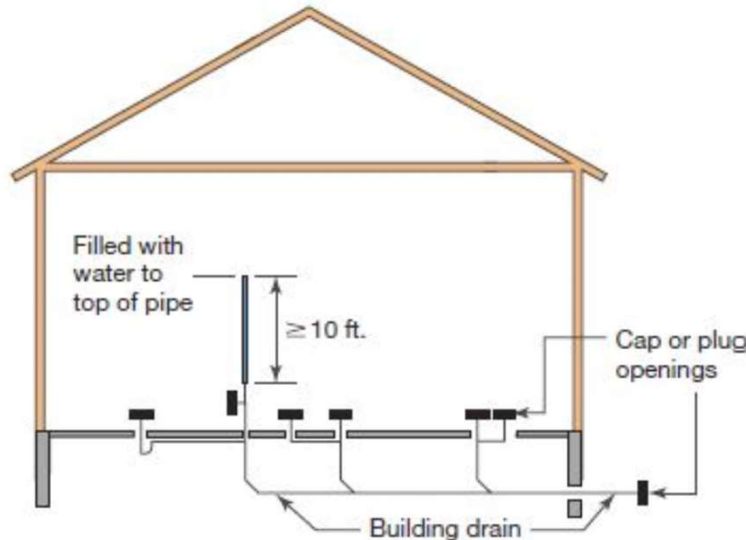
[HENRICO.GOV/BUILD](http://HENRICO.GOV/BUILD)



**PLUMBING**



## Rough plumbing - P2503.5.1



- The head pressure for a water test on DWV systems has been increased from 5' to 10'. (Aligns with IPC)
- Vacuum test option added. DWV systems can be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of -5 pounds per square inch or a negative 10 inches of mercury column (- 34 kPa). This pressure shall be held without the removal of additional air for a period of 15 minutes.

# Plumbing Fixtures

[HENRICO.GOV/BUILD](http://HENRICO.GOV/BUILD)

## Shower & Bathtub control valves - P2708.4, P2713.3



- Clarifies that these shower control valves/mixing valves are to be compatible for the flow rate of the shower head that is installed.
- When the valve has field adjustable temperature limiting capabilities then access shall be provided.
- Shall be field adjusted in accordance with the manufacture's instructions, limiting temperature to not exceed 120 degrees F.
- These valves are to be approved to specific ASSE and/or ASME standards.



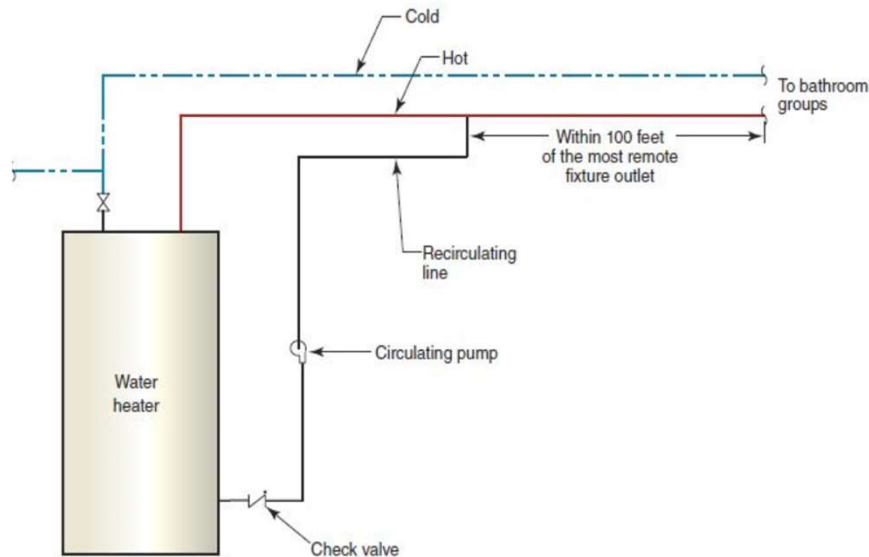
BUILD  
HENRICO

Chapter 29

# Water Supply & Distribution

HENRICO.GOV/BUILD

## Hot water supply to fixtures – P2905.3



- Hot water distribution piping that is supplying plumbing fixtures is not to exceed 100 ft. in developed length. Additional water heaters and/or pumps shall be considered to distribute hot water to these fixtures.

# Water Supply & Distribution

HENRICO.GOV/BUILD

## CPVC plastic piping - P2906.9.1.2

- Virginia adds the option for one-step solvent cementing of CPVC piping and joints to be green in color when solvent meets the ASTM standard.
- One-step CPVC cement can be yellow, red, orange, and now green.
- Green cement stands out better on CPVC pipe and fittings allowing installers and inspectors to more easily identify any joints that were not cemented.

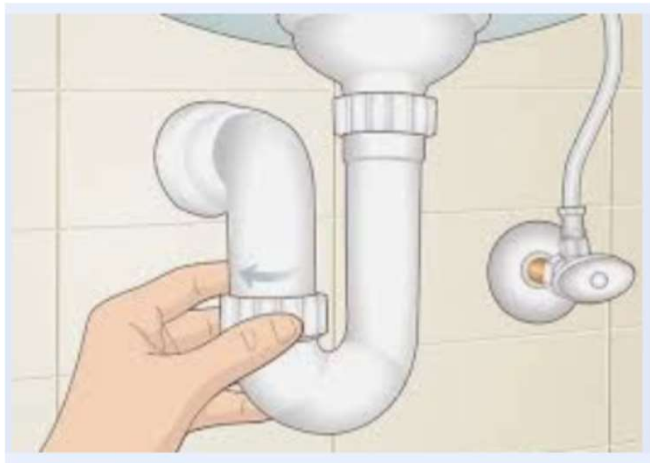




# Sanitary Drainage

HENRICO.GOV/BUILD

## Cleanout equivalent— P3005.2.10.1



- Fixture traps that can be removed without altering the concealed piping are now acceptable as an equivalent cleanout.
- A fixture with an integral trap when uninstalled is now acceptable as an equivalent cleanout. Example: Toilet



# BUILD HENRICO

[HENRICO.GOV/BUILD](https://HENRICO.GOV/BUILD)

The End

