



Mechanical Plan Review Requirements

Department of Planning & Development Review, Bureau of Permits and Inspections

900 East Broad Street, Room 108, Richmond, Virginia 23219

Office: (804) 646-4169

<https://www.rva.gov/planning-development-review/permits-and-inspections>

The following requirements are provided as a reference tool and outline the minimum information and details required on commercial mechanical plans submission for plan review. This guide is designed to help expedite the plan review process by reducing the number of revisions required.

A commercial mechanical permit is required for the installation, alteration of HVAC systems, system components, equipment and appliances including ductwork. A mechanical permit is also required for the installation, alteration of refrigeration systems including walk-in coolers.

Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade plane in height shall comply with the Virginia Mechanical Code or the Virginia Residential Code.

The following set of requirements are based on the 2021 version of the Virginia Uniform Statewide Building Code (VUSBC).

Virginia Mechanical Code (VMC)-2021

Virginia Fuel Gas Code (VFGC)-2021

Virginia Construction Code (VCC)-2021

Virginia Energy Conservation Code (VECC)-2021

Section A - Construction Documents:

1	Construction documents prepared and sealed by a registered design professional for: - The following occupancy classifications: (I) Institutional (all except Group I-4 (Day care facilities)), (E) Educational, (H) High hazard, (A-1) Theatres only if exceeding assembly of 100 persons. - All buildings over 3 stories in height. - Mechanical systems exceeding gauge pressures of 125 pounds per square inch (other than refrigeration) or temperatures of 300°F (other than flue gas).						
2	Construction documents that are not required to be prepared by an RDP, and are prepared by a licensed master HVAC worker, or a licensed Class A contractor with a mechanical specialty designation will provide the signature, name, occupation, address, and telephone number of the person who prepared the plans.						
3	All plans shall be bound into one PDF file.						
4	All plans to be "to scale", the same size and be neat and legible. Provide graphical scales on each plan that has scaled floorplan(s). Drawings at least 1/8" = 1'-0" scale or larger						
5	All plans shall have a blank space that is 3.5" x 2" located somewhere on the plan(s), preferably bottom-right corner, for the City of Richmond's approval stamp. Do not create a box for the stamp, the City of Richmond will determine where to put the stamp.						
6	For projects with more than one plan, a plan legend shall be shown on the first mechanical plan sheet. Provide a complete legend for all symbols and abbreviations/acronyms used in the mechanical drawings. This includes: All room name abbreviations, all device and equipment abbreviations used in panel schedules, one-line diagrams, and plan notes.						
7	Each plan must have a complete title block. Title Block/Show on Each Page <table border="1" style="width: 100%;"><tr><td>Project Name:</td><td>Project Address:</td></tr><tr><td>Designer's Name:</td><td>License #</td></tr><tr><td>Email:</td><td>Page #</td></tr></table>	Project Name:	Project Address:	Designer's Name:	License #	Email:	Page #
Project Name:	Project Address:						
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Email:	Page #						
8	All text on the plans shall be at least 0.125" in height. Photometrics text shall be at least 0.1" in height						
9	The plans shall contain only the scope of work required for this permit only.						
10	Within the scope of work, all rooms/areas (including hallways, closets, and other non-living areas) shall be labeled with their use (include dwelling unit number as well).						
11	Each mechanical sheet with distinct sheet numbers (i.e. M1, M2, etc.)						

12	New work vs. existing work clearly distinguished
13	Provide mechanical plans for each floor and the roof. These shall show the ductwork, layouts, schedules, notes, legends, piping schematics, and details necessary to define the system being installed.
14	If there is any work on the exterior of the building or on the site, a site plan clearly showing the property lines is required. This plan must be sealed by the Professional Engineer or Master Tradesman. (See section A1)
15	Provide complete information on all the mechanical equipment and materials including listing, labeling, installation and compliance with referenced material standards.
16	Details on the HVAC equipment including the equipment capacity (Btu/h input), controls, equipment location, access and clearances.

Section B - General Requirements - All submittals should include (as applicable) the following:

17	Provide energy compliance report. Heating, ventilating and air-conditioning systems of all structures shall be designed and installed for efficient utilization of energy in accordance with the International Energy Conservation Code. VMC Section 301.2
18	Provide detail for rooftop equipment. Revise the detail to show how the roof mounted heat pump is secured to the roof system, including method of attachment. VMC Section 301.15
19	Provide the means and methods used to protect fire rated assemblies that will be penetrated by the line sets and fresh air and exhaust ducts being run to the roof. VMC Section 302.2
20	Indicate the location of all equipment and appliances. It shall be located as required by this section, specific requirements elsewhere in this code and the conditions of the <i>equipment</i> and <i>appliance</i> listing. VMC - 303.1
21	Provide details for the exterior equipment enclosure and indicate how equipment installed at grade will be supported on a level concrete slab or other approved material, extending at least 3 inches above the adjacent finished grade. VMC Section 304.10
22	Provide plans to show the location of the required guard or anchoring devices and include a detail of the required fall protection. VMC Section 304.11
23	The plans shall indicate access to the HVAC equipment. A level working space not less than 30 inches deep and 30 inches wide shall be provided in front of the control side to service an appliance. VMC Section 306.1
24	Provide a floor plan to show how a permanent means of access has been provided to the rooftop mounted equipment. VMC Section 306.5
25	Provide a floor plan to show the condensate system, including piping routing, pipe size, pipe material, method & location of the discharge. VMC Section 307
26	Provide heating and cooling load design calculations, for the purpose of sizing systems, appliances and equipment and showing how compliance with ASHRAE/ACCA 183 has been met. VMC Section 312.1

Section C - Ventilation - All submittals should include (as applicable) the following:

27	Every occupied space is ventilated by natural means or mechanical means per VMC Section 402 and 403.
28	Show on the plan a minimum separation of 10' between the outdoor air intake and the property line. VMC Section 401.4
29	Show and include in floor plan the airflow rate for all the supply air diffusers, the return airflow rates for all return air grills and transfer ducts. VMC Section 403.1
30	The ventilation schedule is needed to ensure sufficient outside air has been provided. Provide outdoor air for ventilation in accordance with this section. Show ventilation calculations. Include all information contained in the provided code section/table. VMC - Table 403.3.1.1
31	For group R-2, R-3 and R-4 occupancies. Local exhaust systems shall be provided in kitchens, bathrooms and toilet rooms and shall have the capacity to exhaust the minimum airflow rate determined in accordance with Table 403.3.2.3.

Section D – Exhaust - All submittals should include (as applicable) the following:

32	The air removed by every mechanical exhaust system shall be discharged outdoors at a point where it will not cause a public nuisance and not less than the distances specified in VMC Section 501.3.1.
33	Exhaust, makeup, supply, return and relief air are provided to maintain the pressure equalization in the space per VMC Section 501.4.

34	Specific requirements for fuel dispensing, battery charging, dry cleaning, application of flammable finishes, hazardous gas storage, LP gas facilities, hazardous production materials (HPM), dipping and coating processes, manicure and pedicure stations, and repair garages operations are covered in VMC Section 502.
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D1 - Exhaust – Clothes dryers

35	Provide manufacturer's installation instructions for the exhaust system. VMC Section 504.1
36	Where the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet in any direction from openings into buildings, including openings in ventilated soffits. VMC Section 504.4.1
37	Makeup air is provided for installations exhausting more than 200 cfm per VMC Section 504.7
38	Dryer exhaust duct length is maximum of 35 feet or is determined by the dryer manufacture. VMC Section 504.9.4.1

D2 - Exhaust – Commercial Kitchen

39	Provide a list of all equipment in the kitchen
40	Indicate the type of commercial kitchen hood to be installed, and complete details of all Type I and II kitchen hoods, grease duct construction and velocity, clearance to combustibles. VMC Section 506.3, 506.4
41	Show Type I - exhaust outlets are a minimum of 10' away from the adjacent property line, and if exception is used, provide elevation/details to verify compliance. VMC Section 506.3.13.3
42	Verify exhaust outlets for Type II hoods terminate per manufacturer's installation instructions and incompliance with requirements. VMC Section 506.4.2
43	Type I Hoods shall be installed where cooking appliances produce grease or smoke as a result of the cooking process, VMC Section 507.2
44	Type II hood shall be installed at or above all commercial food heat processing equipment that produce fumes, steam, odor, or heat per VMC Section 507.3.
45	For Type I hoods, ensure the entire system—including hood, ducts, exhaust equipment, and makeup air—complies with VMC Section 507.1 and the related requirements of Sections 506, 508, and 509.
46	Where any cooking appliance under a single hood requires a Type I hood, a Type I hood shall be installed. Where a Type II hood is required, a Type I or Type II hood shall be installed. Where a Type I hood is installed, the installation of the entire system, including the hood, ducts, exhaust equipment and makeup air system shall comply with the requirements of VMC Sections 506, 507, 508 and 509.
47	Provide exhaust and makeup air calculations for the kitchen or the entire space as applicable. Include all sources of exhaust air and makeup air.
48	Provide makeup air equal to exhaust air. Ensure it does not reduce exhaust effectiveness. Makeup air may be gravity, mechanical, or both. Mechanical systems must operate with exhaust. Intake openings shall comply with VMC 401.4. VMC Section 508.1
49	Show design outdoor air balance; replacement air must equal exhaust plus net exfiltration. VMC Section 508.1.2
50	Indicate on the plans all required grease duct cleanout locations, including proper spacing, cleanouts at changes in direction, access at in-line fans, and horizontal duct sections. VMC Sections 506.3.8 and 506.3.9.
51	UL 710 listing criteria if applicable
52	*Type I hoods requires* a separate Hood Suppression permit application from the City of Richmond to install the suppression system. These are installed by a licensed fire suppression contractor. Cooking appliances required by Section 507.2 to have a Type I hood shall be provided with an approved automatic fire suppression system complying with the International Building Code and the International Fire Code. VMC Section 509

Section E – Combustion Air - All submittals should include (as applicable) the following:

53	Method of supplying combustion air to all fuel fired appliances, the location and size of openings and criteria used to size the openings.
54	Provide adequate combustion air; follow NFPA 31 for oil-fired and manufacturer instructions for solid fuel appliances. Sufficient combustion air is necessary for complete fuel combustion. VMC Section 701.1

Section F – Ducts - All submittals should include (as applicable) the following:

55	Corridors are not served as supply, return, exhaust, relief, or ventilation air ducts per VMC Section
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	601.2. Exceptions apply
56	Return air in plenum complies with one or more condition specified in VMC Section 601.2.1.
57	Return air is not obtained from a closet, bathroom, toilet room, kitchen, garage, boiler room, furnace room or unconditioned attic per VMC Section 601.5. item 7
58	Provide in the plan notes to clearly indicate that the interstitial space is a plenum. Include applicable requirements from VMC Section 602.2.1
59	Size of the HVAC system components including ducts, diffusers, registers, and grilles are provided and in compliance with VMC Section 603.2.
60	All ducts are properly insulated per VMC Section 604.
61	Details of all duct penetrations through fire-resistance rated assemblies including locations for all fire dampers, smoke dampers and ceiling radiation dampers along with applicable fire protection ratings and labeling requirements. VMC Section 607.

F1 - Fire dampers

62	Fire dampers are provided where air distribution system penetrates assemblies required to be rated per VMC Section 607.5.
63	Fire dampers are listed, labeled, and comply with UL 555.

F2 -Ceiling radiation dampers

64	Ceiling radiation dampers are provided where the air distribution system penetrates the ceiling of a floor/ceiling or roof/ceiling assembly which is required to be fire resistant rated per VMC Section 607.6.2.
65	The ceiling radiation dampers are listed, labeled, and comply with UL 555C.
66	For static type ceiling radiation damper, proper shut down method is provided per VMC Section 607.6.2.2.

F3 - Smoke dampers

67	Smoke dampers are provided where the air distribution system penetrates required smoke barriers or smoke partitions per VMC Section 607.5.4.
68	The smoke damper is listed, labeled, and comply with UL 555S.
69	Smoke dampers at air transfer openings in required smoke partitions are activated by a smoke detector per VMC Section 607.3.3.2.
70	Provide clarification and note if the ceiling radiation dampers are listed as static dampers and which method of compliance is used for equipment shut down. VMC Section 607.6.2.2

Section G – Specific Appliances, Fireplaces and Solid Fuel-Burning Equipment - All submittals should include (as applicable) the following:

71	Factory-built fireplaces are listed and labeled in accordance with UL 127.
72	Fireplace stoves are tested in accordance with UL 737.
73	Solid fuel type room heater is tested accordance with UL 1482.
74	Oil fired unit heater is tested in accordance with UL 731.

Section H – Boilers, Water Heaters and Pressure Vessels - All submittals should include (as applicable) the following:

75	Boiler and water heater equipment and piping details including safety controls, gauges, valves and distribution piping layout.
76	Water system serving to both potable and space heating is provided with a temperature actuated mixing valve per VMC Section 1002.2.2.
77	Steam boiler is provided with pressure safety valve per VMC Section 1006.1.
78	Hot water boiler is provided with safety relief valve per VMC Section 1006.2.
79	Working clearance and top clearance is provided for boiler installation per VMC Section 1004.3.
80	Steam and hot water boilers are protected with low-water cutoff control per VMC Section 1007.
81	An expansion tank is installed in each hot water system per VMC Section 1009.

Section I – Refrigeration - All submittals should include (as applicable) the following:

82	Details on the type and quantity of refrigerant, calculations indicating the quantity of refrigerant and refrigerant piping material and the type of connections.
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83	Provide the amount of refrigerant for each RTU, in lbs. Needed to determine compliance with VMC Table 1103.1
84	Provide the system classification of "high-probability" or "low-probability". Needed to determine compliance with VMC section 1103.3
85	Provide the smallest volume of space served by each unit. Needed to determine compliance with VMC Table 1103.1, and 1104.4
86	Permissible amount of refrigeration charge calculation is provided per VMC Section 1104.4.
87	Pressure relief devices, fusible plugs and purge systems located in refrigeration machinery room is terminated outside of the structure, 15 feet above the adjoining grade level and not less than 20 feet from any window, ventilation opening or exit per VMC Section 1105.7.
88	Refrigerant piping is not installed in an enclosed public stairway, stair landing or means of egress per VMC Section 1107.2.
89	Machinery room meets the general and special requirement per VMC Sections 1105 and 1106.
90	Walkin cooler and walk-in freezer refrigeration systems. • Please provide floor plans and construction documents showing where this system is being installed. Details need to be provided such as location of Walkin cooler, condensate disposal plan locations of condensing units etc. • Provide manufacturer's instructions, product data sheets demonstrating that the equipment and appliances complies with UL 427 of UL 60335-2-89 and condensing units comply with UL 1995 or UL 60335-2-89. VMC Section 1101.2

Section J – Oil and Gas Piping - All submittals should include (as applicable) the following:

91	Complete details on the gas piping system including materials, installation, valve locations, sizing criteria and calculations.
92	Appliance is designed for use with the type of fuel to which it will be connected per VMC Section 1301.3. Fill pipe terminates outside of building and 2 feet from any building opening per VMC Section 1305.6.

Section K – Solar Thermal Systems - All submittals should include (as applicable) the following:

93	System design and installation complies with VMC Chapter 14.
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****Manufacturer's installation instructions shall be available on the job site at the time of inspection****

Information about checking the status of plan review and inspection results for which you are the EnerGov contact can be found at:

https://energov.richmondgov.com/EnerGov_Prod/selfservice#/home

Information about the Online Permit Portal can be found at:

<http://www.richmondgov.com/planninganddevelopmentreview/OnlinePermitPortal.aspx>

DHCD link to Virginia Mechanical Code:

<https://codes.iccsafe.org/content/VAMC2021P1>

<https://codes.iccsafe.org/codes/united-states/virginia>