

Heating, Ventilating & Air-Conditioning (HVAC) Plan Submittal Checklist

(September 11, 2019)

Note: Wisconsin Code allows for the submission of HVAC plans at a time after the approval of the building plans. Such submission may involve a different designer, than that of the building plan submission. In all cases, it is extremely important that the HVAC designer coordinate their plan submission with the building plans. This checklist will help provide that coordination. Failure to address the topics below may result in delay of the plan approval and possibly additional plan review fees.

If possible, the HVAC plan approval application form should include the transaction I.D. number of the building plans under the heading: *“Previous Related Transaction I.D.”*

A. Floor Plan

1. Corresponds to submitted or previously approved building plans, including interior layout, room names & uses, wall & roof insulation R-values, door/window/skylight U-factors
2. Location, volume, and/or rates in CFM of exhaust, make-up air, outdoor air and combustion air
3. Location of equipment & appliances, fire, smoke and ceiling radiation dampers, grease duct wraps kitchen hood exhaust duct, grease duct enclosures, suppression systems, controls, monitors, etc.
4. Duct sealing requirements stated
5. HVAC distribution via ductwork, sizing, location
 - a. Metal duct gauge, geometry (round, square, rectangular)
 - b. Flexible duct diameter, specification
 - c. Flexible connector diameter, length limitations
 - d. Underground duct construction, materials, vapor barriers, insulation (R-values), clearances, cross section, slope
 - e. Plenum construction materials and locations

B. Sections or Details

1. Insulation for duct or pipe; type, R-value labeling required on plans and in the field
2. Pipe: size, type, hydronic or gas
3. Exhaust rates in CFM
4. Kitchen hood construction information provided
5. Air transfer to corridors only as allowed by code
6. Clothes dryer exhaust duct distribution, length, access doors, etc.
7. Metal duct gauge, geometry, means of fastening, maximum length
8. Transition duct limitations & requirements
9. Grease duct wrap defined for manufacturer and type
10. Hydronic systems have floor assembly which meets minimum under-floor/slab insulation and testing requirements

C. Equipment Information

1. Equipment schedules or similar provided which define equipment type, capacities, efficiencies, kitchen hood suppression, as well as associated air rates in CFM
2. Listing shows compliance with ASTM/UL/NFPA/ANSI etc. standards as required to be met by the code
3. Operation, setback/demand control ventilation/operational controls/interlocks sequencing of all equipment, and location of controls
4. Provision of economizer indicated if required as part of installation
5. Provision of make-up air
6. Platform & clearance locations for rooftop equipment defined

7. Roof access indicated on plans (if required)
8. Guardrail location and dimensions for roof equipment as required by code
9. Condensate disposal location indicated
10. Duct smoke detection system (if required)
11. Duct smoke detector locations, model defined, installation defined (on return only or return & supply), sequence of operation defined
12. Control panel location, model
13. Smoke control system
14. Apparatus used (based on submitted calculations)
15. Designate pressure classification of the duct system based on inches w.g.
16. Fire, smoke & ceiling radiation dampers defined for ratings, locations & operations
17. Hydronic systems fully defined for type of, length of, size of, flow rate in pipe; testing requirements addressed, under floor insulation (shall be addressed in building envelope calculations)
18. Structural weight of rooftop equipment listed on plan and associated structural design accounted for

D. Calculations

1. Room by room heat loss calculations, not just an overall summary
2. Heat gain calculations may be done by area served by appliance (if AC provided)
3. Transmission plus greater of infiltration or ventilation (furnace sizing)
4. Structural calculations provided to verify that weight of proposed appliances does not exceed load bearing capability of roof, mezzanine, platform, etc.
5. Volume of exhaust and outdoor air intake are approximately the same
6. Smoke control system sizing
7. Outside air required for each room/space where different occupancies are served by one appliance

E. Ventilation Criteria

1. Mechanical ventilation rates used meet minimums listed in SPS Table 364.0403 (or as justified and found acceptable by the Dept.)
2. Natural ventilation as allowed by SPS Table 364.0402
3. Exceptions met and clearly stated on plans or in calculations

F. Minimum Clearances

1. Exhaust & outside air intakes to property lines & buildings
2. Distance between intake to exhaust ventilation openings
3. Overhead clearances (suspended appliance)
4. Location of intakes above ground/roof
5. Combustible material clearances to heat-producing appliance

G. Type of fuel used by HVAC equipment

1. Natural Gas
2. Electricity
3. Fuel Oil
4. Wood or pellets

H. Combustion Air

1. Provide calculations used to determine if internal building air can be used, or if outside combustion air is required to be provided
2. Define number, location and size of transfer ducts, and louver/grill openings

I. Balancing Report is Required to be On-Site

J. Maintenance & Operation Manuals are Required to be Provided to Owner

MISCELLANEOUS REMINDERS

- A. Sprinkler system and/or fire alarm system plans** may also be required to be submitted, see separate checklist and thresholds.
- B. Plumbing plan** submittals may be required; see Plumbing Code SPS 381-387.
- C. Private On-Site Wastewater Treatments Systems (POWTS)** plan submittals may be required; see Plumbing Code SPS 383.
- D. Elevator and escalator plan** submittals may be required; see Elevator Code SPS 318. See Dept. of Safety & Professional Services website for further information.
- E. Swimming pool plan** submittals may be required; see Swimming Pool Code SPS 390.
- F. Boiler installations** require a separate notification; see Boiler Code SPS 341-342.
- G. Refrigeration installations** require a separate notification, see Refrigeration Code SPS 345.
- H. Hospital and Nursing Home building and HVAC plans are not reviewed by Industry Services. The Department of Health Services reviews plans for these facilities, including commercial building code provisions. Call 608-267-1442 for further information.**

HVAC EQUIPMENT REPLACEMENT

1. **Equipment "replacement"**: is a removal of existing, and the installation of new heating, ventilating, or air conditioning equipment with no changes to existing ductwork or piping other than as necessary to fit the new equipment to the existing system. "Replacement" does not include changing equipment sizes or capacities to accommodate building alterations or additions. Substantial changes to ductwork or piping and changes to HVAC equipment sizes or output capacities due to a building addition or alteration will require HVAC alteration plan to be submitted in accordance with section SPS 361.31.
2. **"One-for-one" HVAC/ boiler/ refrigeration equipment replacements** do **not** need to be submitted for review, but must comply with SPS chapters 361-365. However, for boilers and refrigeration units all owners/designers are required to file Form SBD-6314 with the Division of Industry Services, Field Services Bureau. Those forms may be obtained free of charge by calling 608-266-1818 or download from the Dept. of Safety & Professional Services website at <http://165.189.64.111/Default.aspx?Page=eef27a11-b5b8-4759-b669-802a62212415>
3. Although submission to the state is not required, local ordinances may require HVAC equipment information to be submitted prior issuing HVAC permits. Any fees associated with local HVAC permits would be defined by the municipality issuing the permit.
4. **Replacement of equipment (similar in size or greater)**: No state fee or submittal required. Register any boiler/refrigeration replacements with the Division of Industry Services, Field Services Bureau. (as noted above).
5. **Replacement of equipment (substantially smaller in size)**: Submittal is required. "Substantially" means that the output of the new equipment is greater than 15 percent less than the original equipment. Submittal shall include:
 - a. A completed SBD-118 plan application form;
 - b. Appropriate fees, as based on a "miscellaneous fee" per piece of equipment;
 - c. At least four copies of a letter giving the make, model, and BTU output of the equipment being replaced; the make, model, and BTU output of the replacement equipment; and specific UL, AGA, PFS or other recognized laboratory approval;
 - d. Since the BTU output of the replacement equipment is substantially less than that of the equipment being replaced, HVAC heat loss calculations must be submitted proving the adequacy & code compliance of the smaller unit(s);
 - e. If the building contains 50,000 cubic feet total volume or more, the letters and calculations must be signed, sealed, and dated by a Wisconsin registered architect or engineer or HVAC designer. Boiler/refrigeration replacements need to be registered for fees based on the specific equipment in question.
6. **Heating ONLY** equipment is **replaced with** equipment capable of **both heating and cooling**: then plan submittal is required. Fee will be based on area to be served by equipment, plus plan submittal fee. Boiler/refrigeration replacements are required to contact the Division of Industry Services, Field Services Bureau.
7. **Installation of stand-alone equipment** (fireplaces, range hoods, waste oil burners, etc.): submittal is required. Fees are \$250/piece of equipment, plus \$100 plan submittal fee.
8. In all cases involving new equipment, if the new equipment will require fire-rated isolation from the balance of the building where the old equipment did not, evidence of a rated enclosure must be submitted. Typical examples of this type of replacement include changing: from electric or else from direct-vent sealed combustion chamber gas-fired to over 400 MBH traditional gas-fired. Evidence of rated enclosure consists of a letter from an architect, engineer, or certified commercial building inspector stating there is an existing rated room and giving the fire rating of that room in hours. If the room is not adequate, submission must include the building of a new rated room, per SPS 361.31.
9. If mechanical refrigeration equipment is associated with either building cooling or processing, and the system uses a Group A1 or B1 refrigerant having a capacity rated at or greater than 50 horsepower, 50

tons or 50,000 volt-amperes; OR the system uses a Group A2, B2, A3 or B3 refrigerant, having a capacity rated at or greater than 10 horsepower, 10 tons or 10,000 volt-amperes, then the equipment must be registered prior to installing and operating in the field per the WI Refrigeration Code, SPS 345.07. Registration is required to be in writing on Form SBD-34. The form may be obtained from the Division of Industry Services, Field Services, PO Box 7302, 53707-7302, at the Safety & Professional Services web site at <http://dsps.wi.gov/Default.aspx?Page=4fb16025-61b7-4af8-9a7d-d9826176d65d> or telephone 608/261-7730, 608/264-8777 (TTY).

9. The HVAC Designer is reminded that it is their responsibility to verify the existing structure to determine if it can carry the loads of the new equipment. This may require working with an Architect or Structural Engineer to analyze the existing structural capacity. If revisions are required to the existing structure in order to carry new equipment loads, those alterations must be submitted to the division (or delegated agent) for review.