Department of
Licenses and Inspections
CITY OF PHILADELPHIA

Residential HVAC Equipment Design Form – Multi-family

Complete and submit this form with **your Mechanical Permit application** to certify the proposed mechanical equipment for Groups R2/R3/R4 (three stories or less) is sized and the whole-house mechanical ventilation system meets IECC minimum airflow and efficacy requirements.

Permit Application Information

Provide the full address of property and the Permit Application Number

A

Property Address: _____

Permit Application Number: _____

Applicant / Owner

Provide the contact information for the Owner / Applicant

B

Property Owner Name: _____

Applicant Name: _____

Phone Number: _____

HVAC Equipment Design for R-2, R-3, and R-4 three stories or less in height above grade plane.

I. Required Checklist Items

Check the items in the table to certify the proposed mechanical equipment has been sized and selected in accordance with ACCA Manuals J and S.

Note: *Homes pursing ENERGY STAR certification may attach a completed ENERGY STAR National HVAC Design Report in lieu of completing the remainder of this form.*

II. Equipment Sizing and Selection

Complete the Design Loads and Equipment Specifications

C

HVAC Equipment Design for Multi-Family

I. Required Checklist Items

Certify the following required items are compliant:

R403.1.1 Thermostats are programmable	☐
R403.3.1 Ducts ≥ 3” diameter located outside conditioned spaces shall be insulated to ≥ R-8	☐
R403.3.1 Ducts < 3” diameter located outside conditioned spaces shall be insulated to ≥ R-6	☐
R403.3.4.1 Air handler shall have a manufacturer’s designation of ≤ 2% air leakage when tested per ASHRAE 193	☐
R403.3.5 The *Duct and Envelope Testing* form shall be completed and submitted to the inspector	☐
R403.3.7 Building cavities are not used as ducts (IBC-scope buildings only)	☐
R403.4 HVAC pipe insulation is R-3 minimum (e.g. hydronic systems, refrigerant lines) and outdoor insulation is protected	☐
R403.7 Manual J report, including heating and cooling design loads, is attached	☐
R403.7 Heating and cooling equipment shall be selected in accordance with Manual S, based on loads calculated in accordance with Manual J.	☐

II. Equipment Sizing and Selection

Design Loads:

Design Cooling Load: _____ (Btu/h)

Design Heating Load: _____ (Btu/h)

Equipment Specifications:

Cooling System Output Capacity: _____ (Btu/h)

Cooling Equipment Make (Optional): _____

Cooling Equipment Model (Optional): _____

Heating System Output Capacity: _____ (Btu/h)

Heating Equipment Make (Optional): _____

Heating Equipment Model (Optional): _____

Manual S. Specified cooling equipment capacity is ≤ 1.15 times the design load or the next larger nominal size, whichever is greater. (Exception: Heat pumps may exceed the design load by 1.25 times or the next nominal size.)	☐
Manual S. Specified heating equipment capacity is ≤ 1.40 times the design load or the next larger nominal size, whichever is greater	☐
IMC 403.3.2 Whole-house mechanical ventilation worksheet has been completed (*see Part D*)	☐

Whole House Mechanical Ventilation

Complete this section to certify a whole-house mechanical ventilation system has been specified and the fan meets IECC minimum airflow (CFM) and efficacy (Watts/CFM) requirements.

[++] A *balanced ventilation system is required to have concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10% of the total mechanical supply airflow rate.*

D

Whole House Mechanical Ventilation

1. Fill in the conditioned floor area and number of bedrooms for the dwelling:

   Conditioned Floor Area = _____ ft^2 Number of bedrooms: _____

2. Determine the required outdoor airflow rater per *IMC 403.3.2.1 Equation 4-9***:

   $Q_{OA} = 0.01A_{floor} + 7.5(N_{br}+1)$ Where: Q_{OA} = outdoor airflow rate, cfm
   A_{floor} = floor area, ft^2
   N_{br} = number of bedrooms (but not less than one)

   Q_{OA} = 0.01 _____ft^2 + 7.5 (_____ + 1) = _____ **CFM**

   ** Where exception for minimum mechanical ventilation rate reductions are proposed by up to 30% per 2021 IRC, Section M1505.4.3, mechanical plans must be submitted to demonstrate compliant conditions for the proposed ventilation system:

   ☐ Whole house ventilation system is a *balanced ventilation system*[++].
   ☐ Ducted system supplies ventilation air directly to each bedroom, and to one or more of the following rooms (*select one or more of the following*):

   ☐ Living Room ☐ Dining Room ☐ Kitchen

3. Will the fan operate continuously or intermittently: ☑ Continuous ☐ Intermittent

4. **If the fan will be operated intermittently *on a pre-set schedule***, controls shall operate the fan for at least 1 hour of each 4-hour period and the airflow must be increased such that the average cfm over each 4-hour period is not less than the cfm prescribed by Equation 4-9. Describe control schedule below and fill in the design airflow rate:

   Q_{OA} intermittent = _____ CFM

5. Enter the following information regarding the specified fan in accordance with R403.6.2 (*Fan Efficacy*):

   Rated Fan Airflow = _____ CFM Fan Make: _____

   HVI-Rated Fan Efficacy* = _____CFM / Watt Fan Model: _____

   *The fan's rated efficacy meets or exceeds the appropriate value below:

   - HRV or ERV fans, and Air-handler that is integrated to tested & listed HVAC Equipment: **1.2 cfm/watt**
   - In-line supply or exhaust fan: **3.8 cfm/watt**
   - Other exhaust fans 90 cfm or greater: **3.5 cfm/watt**
   - Other exhaust fans less than 90 cfm: **2.8 cfm/watt**

Design Professional / Mechanical Contractor's Name: _____

Design Professional / Mechanical Contractor's Signature: _____Date: _____