Spotsylvania County Building Safety Department
HVAC SYSTEM DESIGN WORKSHEET

Residential Plans Examiner Review Form
For HVAC System Design (Loads, Equipment, Ducts)
Provided by Mechanical Contractor

Contractor _____
Mechanical License # _____
Site Address (street or lot #, block, subdivision)
_____
_____

REQUIRED ATTACHMENTS

- *Air Distribution worksheet must be available to inspector on mechanical Rough-in inspection of duct work*
- *Rescheck if used*

HVAC LOAD CALCULATION (IRC M1401.3)

Design Conditions

Winter Design Conditions

Outdoor Temperature _____ F
Indoor Temperature _____ F
Total Heat loss _____ Btu

Summer Design Conditions

Outdoor Temperature _____ F
Indoor Temperature _____ F
Grains difference _____ GR @ _____ % Rh
Sensible heat gain _____ Btu
Latent heat gain _____ Btu
Total heat gain _____ Btu

Building Construction Information (this information must match information provided by builder)

Building

Orientation (Front door faces) _____
North, East, West, South, Northeast, Northwest, Southeast, Southwest
Number of bedrooms _____
Conditioned floor area _____ Sq Ft
Number of occupants _____

Windows

Eave overhang depth _____ Ft
Internal Shade _____
blinds, drapes, etc.
Number of skylights _____
U-factor of Windows _____

HVAC EQUIPMENT SELECTION (IRC M1401.3)

Heating Equipment Data
Equipment type _____
Furnace, heat pump, boiler, etc.
Model _____
Heating output capacity _____ Btu
Auxiliary heat output capacity _____ Btu

Cooling Equipment Data
Equipment type _____
air conditioner, heat pump, etc.
Model _____
Sensible cooling capacity _____Btu
Latent cooling capacity _____ Btu
Total cooling capacity _____ Btu

Blower Data
Heating CFM _____ CFM
Cooling CFM _____ CFM

DUCT INSPECTION OPTION (N1103.2.2.1)

Testing options for ductwork: Select one - (see page 2 for details)

- ☐ (1) Post construction test- Approved testing agency required
- ☐ (2) Rough-in test- Approved testing agency required
- ☐ (3) Visual test- County Inspection required

Please Check below which option you used. Remember your method and values must match the building plans submitted for review. You must coordinate with your Building designer.

☐ (Prescriptive)Thermal envelope compliance method one (Insulation and Fenestration requirements by component) R-value computation Table N1102.1 2009 IRC.

☐ (U-factor alternative)Thermal Envelope Compliance Method Two (Equivalent U-Factors) Table N1102.1.2 2009 IRC

☐ (Res-check) Thermal Envelope Compliance method three (total UA alternative) ***Provide Document***

Based on M1401.3 2009 IRC. Heating and cooling equipment shall be sized in accordance with ACCA Manual S based on the building loads calculated in accordance with ACCA Manual J. If we should have questions please have your calculations available.

All ductwork must be inspected per Section N1103.2.2 of the Uniform Statewide Building Code

N1103.2.2 Sealing. All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M1601.4.1 of the International Residential Code. Verification of compliance with this section shall be in accordance with either Section N1103.2.2.1 or Section N1103.2.2.2.

N1103.2.2.1 Testing option. *Duct tightness shall be verified by one of the following:*

1. Post-construction test option: Leakage to outdoors shall be less than or equal to 8 cfm (3.78 L/s) per 100 ft2 (9.29 m2) of conditioned floor area or a total leakage less than or equal to 12 cfm (5.66 L/s) per 100 ft2 (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler end closure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test option: Total leakage shall be less than or equal to 6 cfm (2.83 L/s) per 100 ft2 (9.29 m2) of conditioned floor area when tested at a pressure differential of 0.1 inch w.g. (25 Pa) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 cfm (1.89 L/s) per 100 ft2 (9.29 m2) of conditioned floor area.

Exception: Duct tightness test is not required if the air handler and all ducts are located within conditioned space.

When one of these options are chosen, testing shall be performed by approved qualified individuals, testing agencies or contractors. Testing and results shall be as prescribed in Section N1103.2.2 and approved recognized industry standards***. If choosing this option individual testing must be approved by Building Official, Contractor installing the HVAC cannot be the person who does the testing***

3.N1103.2.2.2 Visual inspection option. In addition to the inspection of ducts otherwise required by this code, when the air handler and all ducts are not within conditioned space and this option is chosen to verify duct tightness, duct tightness shall be considered acceptable when the requirements of Section N1103.2.2 are field verified.

If choosing this option the policy of the Spotsylvania County Building Office is that at least two joints must be left visible at time of Mechanical rough- in inspection with the inspector choosing two additional. Someone must be on site to expose joints.

Energy code compliance for residential (VRC 2009) 2009 International Energy Conservation Code Climate Zone 4 Except Marine
Prescriptive Method
TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

Windows and doors			Insulation				Foundation		
FENESTRATION *U*-FACTOR	SKYLIGHT[b] *U*-FACTOR	GLAZED[e] FENESTRATION SHGC	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft.	10/13

For SI: 1 foot = 304.8 mm

a. R-values are minimums. U-factors and solar heat gain coefficient (SHGC) are maximums. R-19 batts compressed in to nominal 2 × 6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.
b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
c. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet.
e. There are no SHGC requirements in the Marine zone.

Additional Virginia Residential Code 2009, Chapter 11, Information is available at:
http://ecodes.biz/ecodes_support/free_resources/Virginia/residential/pdfs/Chapter%2011_Energy%20Efficiency.pdf