

MECHANICAL CODE DISCUSSION

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“Does the Code require a return air in every bedroom or other room that can be closed off?” Let’s review a portion of what the Code says about return air.

2006 International Residential Code, Chapter 16—Duct Systems:

M1601.1 Duct design. Duct systems serving heating, cooling and ventilation equipment shall be fabricated in accordance with the provisions of this section and ACCA Manual D or other approved methods.

M1602.1 Return air. Return air shall be taken from inside the dwelling. Dilution of return air with outdoor air shall be permitted.

M1602.2 Prohibited sources. Outdoor and return air for a forced-air heating or cooling system shall not be taken from the following locations:

Closer than 10 feet (3048 mm) to an appliance vent outlet, a vent opening from a plumbing drainage system or the discharge outlet of an exhaust fan, unless the outlet is 3 feet (914 mm) above the outside air inlet.

Where flammable vapors are present; or where located less than 10 feet (3048 mm) above the surface of any abutting public way or driveway; or where located at grade level by a sidewalk, street, alley or driveway.

A room or space, the volume of which is less than 25 percent of the entire volume served by such system. Where connected by a permanent opening having an area sized in accordance with ACCA Manual D, adjoining rooms or spaces shall be considered as a single room or space for the purpose of determining the volume of such rooms or spaces.

Exception: The minimum volume requirement shall not apply where the amount of return air taken from a room or space is less than or equal to the amount of supply air delivered to such room or space.

A closet, bathroom, toilet room, kitchen, garage, mechanical room, furnace room or other dwelling unit.

A room or space containing a fuel-burning appliance where such room or space serves as the sole source of return air.

Exceptions:

1. The fuel-burning appliance is a direct-vent appliance or an appliance not requiring a vent in accordance with Section

M1801.1 or Chapter 24.

2. The room or space complies with the following requirements:

2.1. The return air shall be taken from a room or space having a volume exceeding 1 cubic foot for each 10 Btu/h (9.6L/W) of combined input rating of all fuel-burning appliances therein.

2.2. The volume of supply air discharged back into the same space shall be approximately equal to the volume of return air taken from the space.

2.3. Return-air inlets shall not be located within 10 feet (3048 mm) of any appliance firebox or draft hood in the same room or space.

3. Rooms or spaces containing solid-fuel burning appliances, provided that return-air inlets are located not less than 10 feet (3048 mm) from the firebox of such appliances.

Summarizing the above Code sections:

- HVAC duct design is to be based on the Code and Manual D.
- Return can be drawn from inside with a portion for ventilation can be drawn from outside.
- Return can’t be drawn from outside where it may be contaminated by vents, exhaust etc.
- Return can’t be drawn from an area that is less than 25% of the total space of the system.
- If transfer grills or other permanent openings are provided between rooms, sized per Manual D, all rooms connected by the openings are considered a single room.
- There are several types of rooms that return air must not be drawn from.

Referring to ANSI/ACCA 1 Manual D-2009, we find:

4-9 LOW RESISTANCE RETURN PATH

An engineered low resistance return path shall be provided for every room or space that receives supply air. This path may be through a ducted return grill, a

transfer duct (fitted with two return grills) to a central return, or a door grill.

Air velocity through return grills shall not exceed 350 FPM, based on the area enclosed by the grill frame (i.e., the nominal size listed in the product performance data). For example, the maximum return CFM for a 10” X 8” return grill is 195 CFM.

MAXIMUM RETURN GRILL CFM = 350 X (10 X 8)/144 = 194 (*we divide by 144 because there are 144 sq. in. per sq. ft.*)

A door undercut will not provide a reasonable solution to the return air problem because the required gap is objectionably large. If a door undercut is used as a return path, the gap shall not be less than the **TABLE A1-2** value (*see table on opposite page*).

- Adequate door cuts will create appearance issues.
- Adequate door cuts create privacy issues (a significant amount of noise is transmitted through a small crack; a door cut provides negligible attenuation).
- Air flow under doors soils carpets.

A large master bedroom requires two 150 CFM supply airs and a 100 CFM supply air in the adjoining bathroom. Referring to the Table, if you would like to undercut the 3’ wide door to meet the return requirement, you’ll need to provide a 5.3” gap under the door. If the door is 2’6” wide, the required gap is 6.4”! Obviously providing return air inlets in each bedroom or transfer grilles is a much better option than cutting off the doors.

We will discuss in a future issue, what problems are created when the return duct system is not installed per Code/Manual D.

Thanks again for the many positive comments and suggestions. Please let me know if you have any suggestions or requests for future discussion. As always, questions and comments are welcome.

Disclaimer (again!) Each subject discussed will include excerpts from the International Codes and Commentary with discussion and comments that may be my opinion/interpretation. While I’m willing to discuss with you, individual issues that you may have with another jurisdiction, please realize have no authority to override an interpretation of another inspector. ★

TABLE A1-2 FOR MECHANICAL CODE (OPPOSITE PAGE)

Door Cut Height for 300 Fpm Air Velocity							
Cfm Under Door	Door Width (Inches)						
	24	30	36	42	48	54	60
Clearance (Inches) to Floor or Top of Carpet							
100	2.0	1.6	1.3	1.1	1.0	0.9	0.8
200	4.0	3.2	2.7	2.3	2.0	1.8	1.6
300	6.0	4.8	4.0	3.4	3.0	2.7	2.4
400	8.0	6.4	5.3	4.6	4.0	3.6	3.2
500	10.0	8.0	6.7	5.7	5.0	4.4	4.0
600	12.0	9.6	8.0	6.9	6.0	5.3	4.8
700	14.0	11.2	9.3	8.0	7.0	6.2	5.6
800	16.0	12.8	10.7	9.1	8.0	7.1	6.4
900	18.0	14.4	12.0	10.3	9.0	8.0	7.2
1,000	20.0	16.0	13.3	11.4	10.0	8.9	8.0
1,200	24.0	19.2	16.0	13.7	12.0	10.7	9.6
1,400	28.0	22.4	18.7	16.0	14.0	12.4	11.2
1,600	32.0	25.6	21.3	18.3	16.0	14.2	12.8

Table A1-2

AN INTERESTING STATISTIC

The Department of Labor data shows that roughly forty percent of the HVACR industry will be eligible to retire in the next decade. During this same period of time, the industry is set to grow between 18 & 26%. The HVACR industry will be looking to recruit and train sixty six percent of its current workforce in the next decade.

USE JOB TITLES TO ATTRACT AND REWARD WORKERS

Job titles are a critical factor in your recruitment efforts. The president of one computer service company once tried an experiment: He offered job candidates at far-flung, isolated locations a choice between the title "sales manager" and "salesperson." Although the "salesperson" position paid \$2,000 a year more, most people took the "manager" title. Job titles can provide status and self-esteem. Think of ways you can attract or reward employees with a prestigious-sounding title.

—Adapted from "Raise or title? Employees take the title," on Womenconnect.com

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