

GUIDANCE FOR AVOIDANCE OF COOL AIR COMPLAINTS

by Armin Rudd

Whole-house ventilation is relatively new in residential buildings. Therefore, some people will question what the fan cycling system is doing. The home sales consultant probably explained it to them, but with so much on their mind at the time, some people won't remember. If needed, a timely and proper re-explanation of the system designed to provide ventilation air distribution for improved indoor air quality, and whole-house mixing for reduced temperature variation, will usually be sufficient.

Here are some design considerations that should be followed by the installing contractor to further reduce the risk of cool air complaints. Do not feed a supply register with a duct larger than 8" diameter, except possibly for high ceilings in open areas. Do not feed a supply register in a bedroom with a duct larger than 6" and keep the duct velocity below 500 ft/min, which should keep the volume flow below 100 cfm. Reasonable care should be taken to avoid blowing air directly on beds. This will prevent cool air complaints in winter when fan cycling occurs without heat. This is especially important for master bedrooms, so focus there first. For example, use two supply registers in the master bedroom as opposed to one large register; always split an 8" duct into two 6" ducts for master bedrooms.

As a guide, Table 1 shows air flow in ft³/min as a function of flexible duct diameter (in) and air velocity (ft/min).

Table 1 Air flow, velocity and duct sizing guide

		CFM of round flex duct at given velocities					
		ft/min for supply run-outs (blk) and return ducts (brn)					
area (in ²)	inch dia.	250	300	350	400	450	500
12.6	4	22	26	31	35	39	44
19.6	5	34	41	48	55	61	68
28.3	6	49	59	69	79	88	98
38.5	7	67	80	94	107	120	134
50.3	8	87	105	122	140	157	175
63.6	9	110	133	155	177	199	221
78.5	10	136	164	191	218	245	273
113.1	12	196	236	275	314	353	393
153.9	14	267	321	374	428	481	535
201.1	16	349	419	489	559	628	698
254.5	18	442	530	619	707	795	884
314.2	20	545	654	764	873	982	1091
380.1	22	660	792	924	1056	1188	1320
452.4	24	785	942	1100	1257	1414	1571
530.9	26	922	1106	1290	1475	1659	1844
615.8	28	1069	1283	1497	1710	1924	2138
706.9	30	1227	1473	1718	1963	2209	2454

General branching conventions:

1-5" goes to 2-4"

1-6" goes to 2-5"

1-8" goes to 2-6"