

TABLE 5. HEATING CAPACITIES AND CFM OF BRANCH DUCTS IN EXTENDED PLENUM PERIMETER SYSTEMS (Concluded)

SECTION E. SIDE TAKEOFF TO 6-INCH ROUND PIPE FOR SIDEWALL AND FLOOR DIFFUSERS
Extended Plenum Pressure 0.18 in. Static at 180 F Furnace Plenum Pressure 0.15 in. Static at 170 F

No. of Elbows		ACTUAL LENGTH FROM EXTENDED PLENUM TO DIFFUSER—FEET											
		5	10	15	20	25	30	35	40	45	50	55	60
0	Btuh Cfm							8800 123.2	7930 120.0	7310 116.8	6740 114.0	6230 111.4	5800 109.1
1	Btuh Cfm							8560 117.4	7900 114.5	7290 112.1	6720 109.2	6200 107.0	5740 104.8
2	Btuh Cfm					8510 112.7	7890 110.0	7300 107.6	6740 105.3	6230 103.1	5750 101.0	5310 99.0	4960 97.4
3	Btuh Cfm				8540 108.2	7900 105.8	7300 103.6	6780 101.5	6270 99.6	5800 97.8	5360 95.9	4960 94.0	4610 92.5
4	Btuh Cfm			8580 104.0	7970 101.9	7370 99.8	6820 97.8	6330 96.0	5850 94.5	5410 92.8	5000 91.1	4620 89.7	4300 88.3
5	Btuh Cfm		8720 100.2	8080 98.3	7490 96.7	6940 94.8	6440 93.0	5960 91.4	5490 90.0	5080 88.7	4690 87.2	4320 85.0	4020 84.7
6	Btuh Cfm	8900 97.0	8240 95.1	7630 93.4	7060 91.9	6550 90.2	6070 88.8	5600 87.3	5190 86.2	4800 85.0	4430 83.8	4100 82.6	3810 81.5

Note: Where any of the first three runs from the extended plenum exceeds 20 ft and 3 elbows, count 3 extra elbows for that run.

The Equivalent Length Values used and included in calculating this table are: Diffuser and Boot = 40 ft; Each Elbow = 14 ft; Side Takeoff = 20 ft.

Tapered Extended Plenum Starting Collar.

SECTION F. TOP TAKEOFF TO 6-INCH ROUND PIPE FOR SIDEWALL AND FLOOR DIFFUSERS
Extended Plenum Pressure 0.18 in. Static at 180 F Furnace Plenum Pressure 0.15 in. Static at 170 F

No. of Elbows		ACTUAL LENGTH FROM EXTENDED PLENUM TO DIFFUSER—FEET											
		5	10	15	20	25	30	35	40	45	50	55	60
0	Btuh Cfm					8430 111.2	7800 108.8	7210 106.3	6660 104.4	6170 102.2	5700 100.2	5270 98.4	4910 96.7
1	Btuh Cfm				8450 107.2	7840 105.0	7250 102.8	6700 100.7	6210 98.9	5730 97.0	5300 95.1	4900 93.4	4560 91.9
2	Btuh Cfm			8530 103.2	7900 101.1	7320 99.0	6800 97.2	6280 95.4	5790 93.8	5350 92.1	4960 90.6	4590 89.0	4250 87.8
3	Btuh Cfm		8660 99.7	8020 97.8	7430 96.0	6900 94.2	6370 92.4	5900 90.8	5450 89.4	5030 88.0	4650 86.7	4300 85.3	3990 84.2
4	Btuh Cfm	8810 96.0	8180 94.4	7580 92.8	7010 91.2	6500 89.7	6000 88.0	5550 86.8	5150 85.7	4750 84.3	4400 83.1	4070 82.0	3780 81.1
5	Btuh Cfm	8390 91.4	7770 90.0	7200 88.5	6650 87.2	6160 85.8	5700 84.5	5280 83.2	4890 82.4	4500 81.0	4170 80.0	3840 79.0	3580 78.3
6	Btuh Cfm	7980 87.5	7380 86.2	6840 85.0	6340 83.8	5880 82.5	5430 81.4	5020 80.2	4650 79.4	4290 78.3	3970 77.3	3660 76.3	3400 75.6

Note: Where any of the first three runs from the extended plenum exceeds 20 ft. and 3 elbows count 3 extra elbows for that run.

The Equivalent Length Values used and included in calculating this table are: Diffuser and Boot = 40 ft; Each Elbow = 14 ft; Top Takeoff = 50 ft.

Tapered Extended Plenum Starting Collar.

TABLE 6. REQUIRED SIZE OF EXTENDED PLENUM

CFM HANDLED BY PLENUM	PLENUM DIMENSIONS INCHES	CFM HANDLED BY PLENUM	PLENUM DIMENSIONS INCHES
Up to 300	8 x 8	701 to 800	20 x 8
301 to 400	10 x 8	801 to 900	22 x 8
401 to 500	12 x 8	901 to 1000	24 x 8
501 to 600	14 x 8	1001 to 1100	26 x 8
601 to 700	16 x 8	1101 to 1200	28 x 8

Design of Return Duct System for Perimeter Installations

With perimeter systems designed in accordance with the foregoing simplified procedures, there is a circulating head of only 0.05 in. water available on the return side of the system. It is therefore necessary that the return ducts be adequately sized and be as short and straight as practicable. The return grilles may be centrally located, and the ducts may be located in the attic or other unheated spaces provided they are adequately insulated. Return air may be taken from basements and crawl spaces, but should not be taken from confined spaces in which the furnace is located.

The following simplified procedure⁵ may be used:

1. Lay out the return-air duct system. Measure the length and count the number of 90 deg turns in each return duct.
2. Total the heat loss of the area served by each return duct.
3. Determine the required duct free area from the length of duct, the number of 90 deg turns, and the heat loss using Table 7. Also determine the free area of the return grille from Table 7.

Other Perimeter Systems

Each of the foregoing procedures can be used with approved furnaces which are capable of delivering their rated cfm air volume against a total

TABLE 7. REQUIRED SIZE OF RETURN AIR GRILLE AND DUCT
For Pressure Drop Allowance of 0.05 In. of Water

ACTUAL FT.	GRILLE FREE AREA	Up to 10 Ft						11 to 20 Ft						21 to 30 Ft						31 to 40 Ft					
		No. of 90 Deg Turns						No. of 90 Deg Turns						No. of 90 Deg Turns						No. of 90 Deg Turns					
		1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
	Btuh	DUCT FREE AREA																							
16	5,000	14	17	20	23	26	28	15	19	22	25	27	28	17	20	23	25	27	28	18	21	24	27	28	30
32	10,000	27	32	37	42	46	49	29	34	39	43	47	49	31	36	41	45	48	51	33	38	43	47	49	51
47	15,000	37	44	50	55	60	64	40	46	52	57	61	65	43	49	54	58	63	67	45	51	56	61	64	67
63	20,000	46	54	61	66	73	78	49	57	63	69	75	79	53	60	65	71	77	82	55	62	68	74	78	83
79	25,000	54	64	72	79	86	92	58	68	75	82	88	94	62	71	78	84	91	96	66	74	80	87	92	98
95	30,000	62	73	82	89	97	104	67	78	85	93	100	106	71	80	88	95	102	108	75	84	91	99	104	110
111	35,000	69	82	92	101	111	119	74	85	95	106	114	121	79	91	99	108	117	124	84	94	103	113	119	126
126	40,000	77	90	100	110	121	130	82	94	105	116	124	132	87	99	109	118	128	137	92	103	113	123	130	140
158	50,000	89	105	119	132	146	158	95	111	124	138	150	161	102	117	129	142	155	168	108	123	135	148	158	170
190	60,000	100	122	139	154	170	181	111	129	145	161	174	184	119	137	151	168	189	208	128	143	159	172	181	193
221	70,000	117	139	158	174	191	203	127	147	164	182	195	206	135	155	171	188	209	213	144	162	178	193	203	216
252	80,000	128	155	175	191	208	222	140	164	182	198	214	225	151	172	188	203	219	231	160	179	195	211	222	235
284	90,000	141	168	188	205	225	244	153	177	195	213	232	248	164	186	201	218	240	256	173	193	209	229	244	262
316	100,000	154	180	200	221	247	265	166	189	209	233	252	270	176	198	217	239	258	277	185	206	227	250	265	285

Note: Where a multiple number of return air ducts join together, add the individual duct free areas together to determine the free area of duct to be used from that point to the return air plenum of furnace.