

Duct System Design Basics

Duct systems are designed to properly distribute air throughout a building. Ducts that are not well designed result in discomfort, high energy costs, bad air quality, and increased noise levels.

Choosing the right-sized duct is critical to maintain proper air flow in the system.

Below is a simple model for determining duct sizes. The model applies to system up to 60 feet from unit to register. Because of the complexity of designing duct systems, we highly recommend using the ACCA "Manual D" for sizing ductwork, or consulting a professional HVAC contractor. Refer to the links on the left for more information.

Determine your duct size based on the required CFM (cubic feet per minute).

C.F.M.	Heating BTU	Cooling BTU	Round Size (in.)	Rectangular Size (in.)
60	4,400	1,820	5	
70	5,180	3,030	6	
100	7,400	3,640	6	3 1/4x10
120	8,900	4,390	7	3 1/4x12
145	10,700	5,450	7	3 1/4x14
180	13,300	6,360	8	6x8
210	15,600	8,200	8	6x8
270	20,000	8,800	9	8x8
290	21,500	9,100	9	8x8
300	22,200	11,200	9	8x8
370	27,400	11,800	10	10x8
390	28,900	13,900	10	10x8
460	34,000	17,000	10	12x8
560	41,500	18,800	12	14x8
620	45,900	20,000	12	14x8
660	48,900	24,200	12	16x8
800	59,300	27,300	12	18x8
900	66,700	28,200	14	20x8
930	68,900	30,300	14	20x8
1000	74,100	33,300	14	22x8
1100	81,500	36,400	14	24x8
1200	88,900	39,400	16	26x8
1300	96,300	42,400	16	28x8
1400	103,700	45,500	17	30x8
1500	111,100	51,500	17	24x10
1700	128,900	54,500	18	26x10

1800	133,300	57,600	18	26x10
1900	140,700	60,600	18	28x10
2000	148,100	66,700	18	30x10

The model assumes 0.1 FPM (friction rate per 100 feet of duct) for supply and return, and an average number of fittings. For one or two long branch lines, we suggest one size larger branch pipe.