

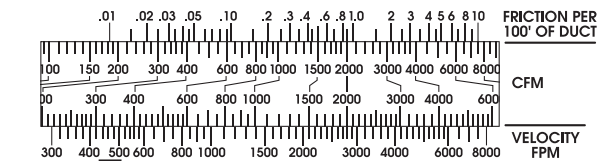
AIR DUCT CALCULATOR

Water resistant slide tool to quickly make duct calculations. Includes a variety of useful charts, formulas, and diagrams on the back.

AIR DUCT CALCULATOR

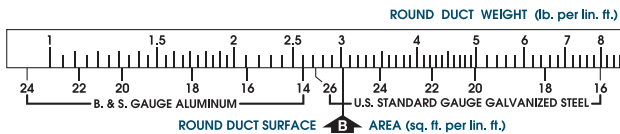
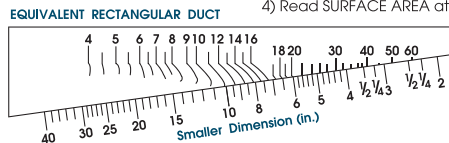
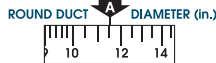


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EQUAL-FRICTION METHOD

- 1) Set CFM under FRICION and read VELOCITY below CFM.
- 2) Read ROUND DUCT DIAMETER at arrow A.
- 3) Select EQUIVALENT RECTANGULAR DUCT and read ROUND DUCT WEIGHT opposite appropriate GAUGE.
- 4) Read SURFACE AREA at arrow B.

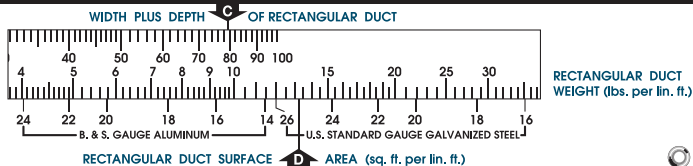


VELOCITY-REDUCTION METHOD

- 1) Set CFM at VELOCITY and read FRICION above CFM.
- 2) Read other data as instructed under EQUAL-FRICTION.

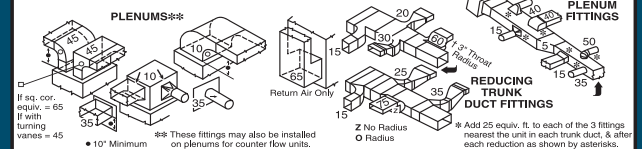
WIDTH PLUS DEPTH

- 1) Set total of WIDTH PLUS DEPTH OF RECTANGULAR DUCT at arrow C.
- 2) Read RECTANGULAR DUCT WEIGHT opposite appropriate GAUGE.
- 3) Read SURFACE AREA at arrow D.



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COMMONLY USED FITTINGS – CONNECTIONS ETC. AS INDICATED



ROUND TRUNK DUCT & FITTINGS.	TOTAL EFF. LENGTH DUCT & FITTINGS. (in feet)	CORRECTED PRESSURE DROP (FRICTION) PER 100 FT. DUCT LENGTH*	TOTAL PRESSURE DROP (in. of water column)
35-44	13.15	20.25	26.32
45-54	10.12	16.20	20.32
55-64	08.10	13.17	17.27
65-74	07.09	11.14	14.20
75-84	06.08	10.13	13.16
85-94	05.07	09.11	11.14
95-104	04.06	08.10	10.13
105-114	03.05	07.09	09.11
115-124	02.04	06.08	08.10
130-149	01.04	05.07	07.09
150-169	00.04	04.06	06.08
170-189	00.03	03.05	05.07
190-214	00.03	03.04	05.06
215-239	00.02	02.03	04.05
240-264	00.02	02.03	04.05
265-289	00.02	02.03	04.05
290-324	00.02	02.03	04.05
325-374	00.02	02.03	04.05
375-424	00.01	02.03	04.05
425-474	00.01	02.03	04.05
475-524	00.01	02.03	04.05
525-574	00.01	02.03	04.05
575-625	00.01	02.03	04.05

NOTE: Scale on front of chart is for 100 ft. of duct. For greater or lesser equivalent lengths, use friction indicated in above table.

* Formula for Friction Loss = $\frac{\text{Friction Loss (if not found in above table)} \times \text{System design pressure} \times 100}{\text{Total equivalent length of duct}}$

BASIC AIR CONDITIONING FORMULAS

(For legend see bottom of slide)

COOLING	HEATING and HUMIDIFYING
$H_s = CFM_T \times 1.08 \times (T_1 - T_2)$	$H_s = CFM_T \times 1.08 \times (T_2 - T_1)$
$H_L = CFM_T \times .68 \times (W_1 - W_2)$	$H_L = CFM_T \times .68 \times (W_2 - W_1)$
$H_T = CFM_T \times 4.5 \times (h_1 - h_2)$	$H_T = CFM_T \times 4.5 \times (h_2 - h_1)$
$T_1 = t_1 + \frac{CFM_Q}{CFM_T} \times (t_2 - t_1)$	$T_1 = t_1 + \frac{CFM_Q}{CFM_T} \times (t_1 - t_2)$
1) If duct heat gain is a factor, add to T_1 : $\frac{\text{Duct Heat Gain (Btu/h)}}{CFM_T \times 1.08}$	2) If duct heat loss is a factor, subtract $\frac{\text{Duct Heat Loss (Btu/h)}}{CFM_T \times 1.08}$
$T_2 = T_1 - \frac{H_s}{CFM_T \times 1.08}$	$T_2 = T_1 + \frac{H_s}{CFM_T \times 1.08}$
$CFM_T = \frac{H_s \text{ (total)}}{1.08 \times (T_1 - T_2)}$	$CFM_T = \frac{H_s}{1.08 \times (T_2 - T_1)}$
$CFM_T = \frac{H_s \text{ (internal)}}{1.08 \times (t_1 - t_2)}$	3) Sensible load of outside air not included.
1) $h_2 = h_1 - \frac{H_T}{CFM_T \times 4.5}$	2) $h_2 = h_1 + \frac{H_T}{CFM_T \times 4.5}$

Leaving Air W.B. Temperature: Refer to Enthalpy Table and read W.B. temperature corresponding to enthalpy of leaving air (h_2).

For Cooling see [1] For Heating see [2]

CFM _a = CFM _b × $\frac{RPM_a}{RPM_b}$	BASIC FAN LAWS	SP _a = SP _b × $\left(\frac{RPM_a}{RPM_b}\right)^2$	Friction Loss = System design pres. x 100 per 100 ft. Total equiv. length of duct
	a = NEW b = OLD	HP _a = HP _b × $\left(\frac{RPM_a}{RPM_b}\right)^3$	

PARAGON

DEDICATED OUTDOOR AIR SYSTEM