※This **software pack** includes a program and a key. Open **eDUCT** file in CD, click SETUP and follow the steps to finish installation. Then desktop will exist **eDUCT** execution file. (2020/04/15)

enhanced DUCT Design Software (eDUCT) Manual

★To compute (total) pressure loss, duct size, fan horsepower, etc.
★To verify Moody chart, Darcy equation and Colebrook equation, etc.

(A)Symbols:

FN：fitting No.
SN：serial No.
Q：flowrate(L/s)
V：velocity(m/s)
ε ：absolute roughness(mm)
T：temperature(℃db)
RH：relative humidity(%RH)
ρ ：density (kg/m^3)
P_v：velocity pressure(Pa)
ΔP_L：friction loss(Pa/m)
D：duct diameter(mm)

ν ：kinematic viscosity(m^2/s)
ε /D: relative roughness (-)
Re：Reynolds No.(-)
f：friction factor(-)
Cs：fitting loss coefficient(-)
H：given duct height(mm)
W：specified duct width(mm)
L：duct length(m)
Ras：aspect ratio(W/H≦5)
As：duct area(m^2, =(H+W)×L×2.03)
De：equivalent diameter of rectangular duct(mm)

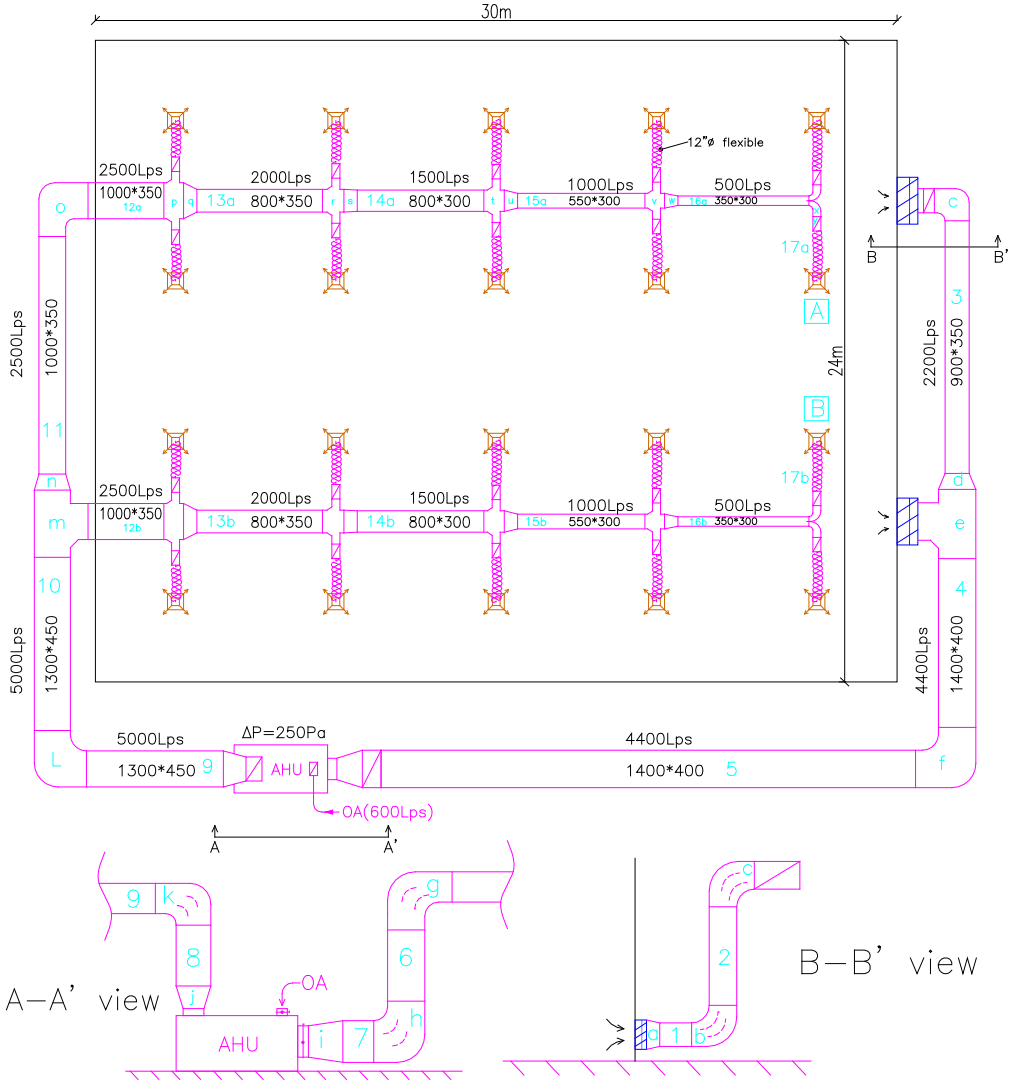
P_f：fitting pressure loss(Pa, =Cs*P_v)
P_m：main duct pressure loss(Pa, =ΔP_L*L)
P_t：total pressure loss(Pa, =P_f+P_m)
P_T：fan total pres.(Pa)
P_S：fan static pres.(Pa)
θ_f：fan total pres. eff.
θ_{fs}：fan static pres. eff.
θ_m：motor eff.
θ_b：belt eff.
θ_b=1.0 if no belt is used.

(B)Hints for ρ (kg/m^3) and ε (mm):

(1)Standard air (20℃ & 0%RH or (ρ)1.204 kg/m^3) is normally adopted for common HVAC ducts.
(2)common ε values：PVC(0.04)，galvanized steel round(0.09)，galvanized steel spiral(0.12)，flexible aluminum, 100% extended(2.0)
(3)other ρ and ε values can be found by visiting public websites.

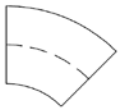
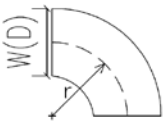
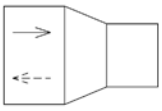
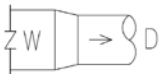
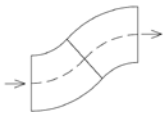
(C)Duct Diagram Example (※Refer to eDUCT Software in fig 2.)

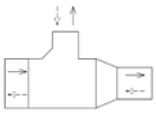
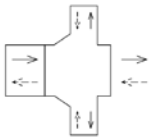
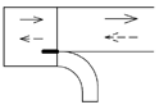
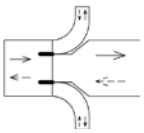
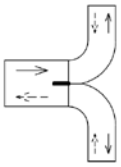
(1)Number each straight duct, such as ①②③…. Mark each fitting, such as a b c ….
(2)Usually the longest path (path A) has the largest friction loss. However, sometimes the shorter branch path B may have larger loss depending on fitting's shape & quantity..



(D)Common Use Fitting Loss Coefficients(Cs)(※approximate values)

★The Cs values in ASHRAE Duct Fitting Database are preferred.

	1	2	3	4	5
	45° elbow	90° elbow	transition	rectangular-round	double 45° elbow
Symbol					
Cs	0.05~0.2(≒0.13)	0.1~0.35(≒0.25)	0.1~0.3(≒0.2)	0.1~0.35(≒0.25)	0.15~0.35(≒0.2)

	6	7	8	9	10
	wye (≦30°)	double wye (≦30~45°)	2-way junction	Junction w / 2 splitters	dovetail
Symbol					
Cs(main)	0.1~0.35(≒0.25)	0.1~0.35(≒0.25)	0.1~0.35(≒0.25)	0.1~0.35(≒0.25)	0.1~0.25(≒0.15)
Cs(branch)	0.2~0.7(≒0.45)	0.2~0.7(≒0.45)	0.2~0.7(≒0.45)	0.2~0.7(≒0.45)	0.1~0.25(≒0.15)

(≒0.00) Cs can be used for general calculation.

(E)Operating Steps: (Refer to Computer Screen)

(1) **fig 1**: Select **New Project** or **Existing file**
(2) **fig 2**: Select one project and click OK
(3) **fig 3**:① Input Customer, Project and Date
② **Must Inputs**: Input Q、V、ε and T(℃)
Defaults: ε(0.09), T(20) and RH(0.1%).
③ Option Input: Input %RH(cannot be 0.00%) or ρ.
Defaults 0.01%RH and ρ(1.204) can be changed.
④ Remarks: Input fitting No. & Straight duct No.
⑤ Click NEXT or EXIT

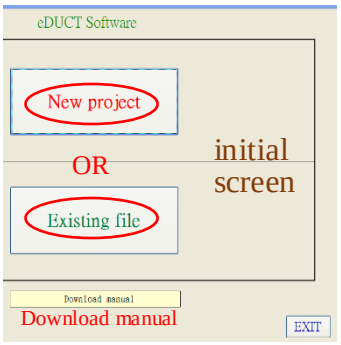


fig1.

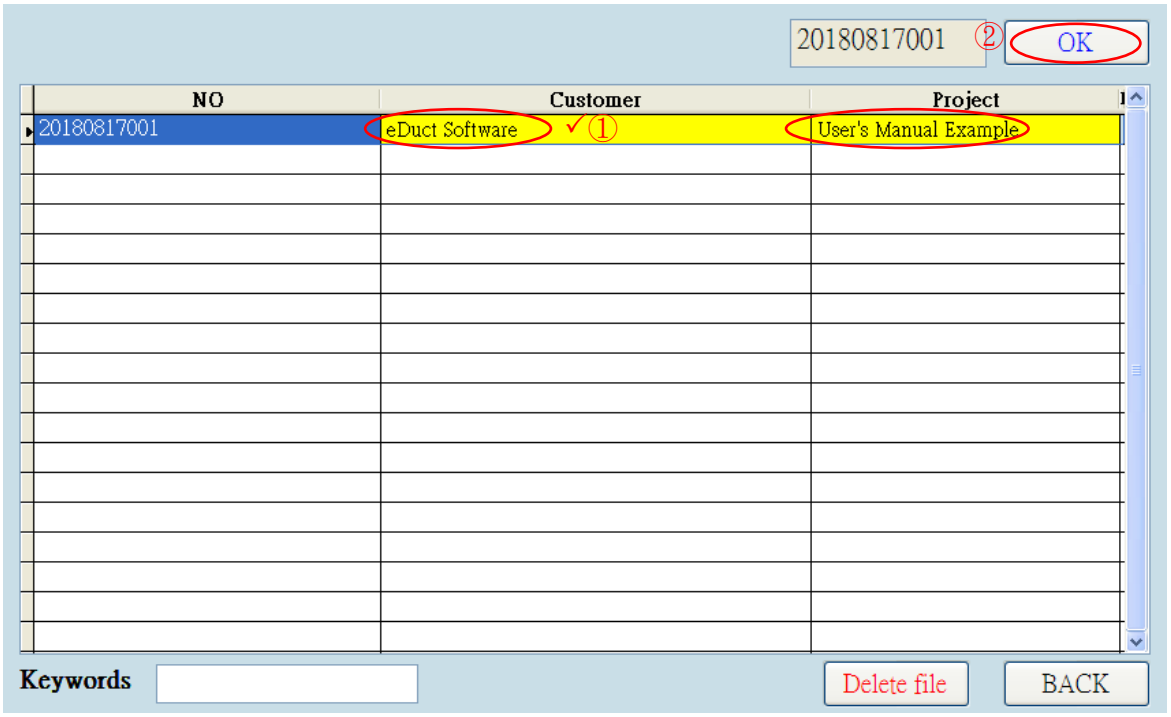


fig 2.

⑥If「**Equal Friction Loss**」method is adopted, like this example, suppose target ΔPL(column 8) is 1.00Pa/m, try to input V value (Column 2) until (column 8) ΔPL≒1.00Pa/m.

⑦Data in Column 11~13 can be used to verify Corebrook Eq(1/√f=-2log[0.27(ε/D)+(2.51/Re/√f)].

(4) **fig4**: Input Cs, H, W and L; quick double click **C_s** column and the default values(0.2, 350, 700 and 1.00) will be shown on screen. Default values can be changed. Let H=D if round duct is used. Input duct width (column **W**) by "trial and error". For example, for SN1(Row 1), input a certain value at W column, such as 800(mm) first and see if De (column **De**) is equal to D (column **D**). If it isn't, try another W value (900) until De(597)≒D(592). H value is specified by designer. As(m^2) is the required duct surface area. As(m^2)=(H+W)*L*2.03. 3% is making-loss rate.

※Go back to fig 3 if you want to modify any data in **Copied from Table 1** and **Remarks**.

fig 3.

NO: 20180817001 Customer: eDuct Software ① Project: User's Manual Example Date: 2018/08/17 NEXT⑤

	Must Inputs ②				Option Input ③			Outputs					④ Remarks
	1	2	3	4	5	6	7	8	9	10	11 ⑦	12	13	14
SN	Q L/s	V m/s	ε mm	T ℃	RH %	ρ kg/m^3	Pv Pa	ΔPL⑥ Pa/m	D mm	ν m^2/s	ε /D	Re	f	Noted by Designer FN & SN refer to attached duct diagram
1	2200.0	8.00	0.090	20.0	0.1	1.204	38.5	1.016	592	0.00001508	0.000152	313988.2	0.0156	return grille-1 transition(a)
2	2200.0	8.00	0.090	20.0	0.1	1.204	38.5	1.016	592	0.00001508	0.000152	313988.2	0.0156	elbow (b), SN1-2
3	2200.0	8.00	0.090	20.0	0.1	1.204	38.5	1.016	592	0.00001508	0.000152	313988.2	0.0156	elbow(c), SN2-3
4	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	transition(d), wye main(e), SN3-4
5	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	elbow(f), SN4-5
6	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.74	0.0145	elboe(g), SN5-6
7	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	elbow(h), SN6-7, transition(i), SN7-AHU
8	5000.0	9.70	0.090	20.0	0.1	1.204	56.6	1.001	810	0.00001508	0.000111	521228.1	0.0143	transition(j), AHU-SN8
9	5000.0	9.70	0.090	20.0	0.1	1.204	56.6	1.001	810	0.00001508	0.000111	521228.1	0.0143	elbow(k), SN8-9
10	5000.0	9.70	0.090	20.0	0.1	1.204	56.6	1.001	810	0.00001508	0.000111	521228.1	0.0143	elbow(l), SN9-10
11	2500.0	8.20	0.090	20.0	0.1	1.204	40.5	1.000	623	0.00001508	0.000144	338870.6	0.0154	wye main(m), transition(n), SN10-11
12	2500.0	8.20	0.090	20.0	0.1	1.204	40.5	1.000	623	0.00001508	0.000144	338870.6	0.0154	elbow(o), SN11-12a
13	2000.0	7.80	0.090	20.0	0.1	1.204	36.6	1.011	571	0.00001508	0.000158	295610.1	0.0158	wye main(p), transition(q), SN12a-13a
14	1500.0	7.30	0.090	20.0	0.1	1.204	32.1	1.021	511	0.00001508	0.000176	247664.6	0.0163	wye main(r), transition(s), SN13a-14a
15	1000.0	6.60	0.090	20.0	0.1	1.204	26.2	1.018	439	0.00001508	0.000205	192277.7	0.0170	wye main(t), transition(u), SN14a-15a
16	500.0	5.50	0.090	20.0	0.1	1.204	18.2	0.992	340	0.00001508	0.000265	124114.7	0.0185	wye main(v), transition(w), SN15a-16a
17	250.0	3.74	2.000	20.0	0.1	1.204	8.4	1.003	292	0.00001508	0.006856	72370.7	0.0347	dovetail(x), rectangular-round(y), SN16a-17a
18	0.0	0.00	0.000	0.0	0.0	0.000	0.00000	0.00000	0.00000	0.000000000	0.0000000	0.0000000	0.0000000	flexible duct(ε =2.0, D=300), SN17a-diffuser
19	0.0	0.00	0.000	0.0	0.0	0.000	0.00000	0.00000	0.00000	0.000000000	0.0000000	0.0000000	0.0000000	★for deleting all inputs
20	0.0	0.00	0.000	0.0	0.0	0.000	0.00000	0.00000	0.00000	0.000000000	0.0000000	0.0000000	0.0000000	
21	0.0	0.00	0.000	0.0	0.0	0.000	0.00000	0.00000	0.00000	0.000000000	0.0000000	0.0000000	0.0000000	

EXIT

fig 4.

BACK NEXT

	Copied From Table 1					Inputs				Outputs						Remarks
SN	Q L/S	V m/s	Pv Pa	ΔPL Pa/m	D mm	Cs	H mm	W mm	L m	Ras W/H	De mm	As m^2	Pf Pa	Pm Pa	Pt Pa	Noted by Designer FN & SN refer to attached duct diagram
1	2200.0	8.00	38.5	1.016	592	0.20	350	900	1.00	2.57	597	2.54	7.70	1.00	8.70	return grille-1 transition(a)
2	2200.0	8.00	38.5	1.016	592	0.25	350	900	3.00	2.57	597	7.61	9.60	3.00	12.70	elbow (b), SN1-2
3	2200.0	8.00	38.5	1.016	592	0.25	350	900	12.00	2.57	597	30.45	9.60	12.20	21.80	elbow(c), SN2-3
4	4400.0	9.40	53.2	0.999	772	0.45	400	1400	6.00	3.50	781	21.92	23.90	6.00	29.90	transition(d), wye main(e), SN3-4
5	4400.0	9.40	53.2	0.999	772	0.25	400	1400	24.00	3.50	781	87.70	13.30	24.00	37.30	elbow(f), SN4-5
6	4400.0	9.40	53.2	0.999	772	0.25	400	1400	3.00	3.50	781	10.96	13.30	3.00	16.30	elboe(g), SN5-6
7	4400.0	9.40	53.2	0.999	772	0.45	400	1400	1.00	3.50	781	3.65	23.90	1.00	24.90	elbow(h), SN6-7, transition(i), SN7-AHU
8	5000.0	9.70	56.6	1.001	810	0.20	450	1300	3.00	2.89	808	10.66	11.30	3.00	14.30	transition(j), AHU-SN8
9	5000.0	9.70	56.6	1.001	810	0.25	450	1300	6.00	2.89	808	21.32	14.20	6.00	20.20	elbow(k), SN8-9
10	5000.0	9.70	56.6	1.001	810	0.25	450	1300	12.00	2.89	808	42.63	14.20	12.00	26.20	elbow(l), SN9-10
11	2500.0	8.20	40.5	1.000	623	0.45	350	1000	12.00	2.86	626	32.89	18.20	12.00	30.20	wye main(m), transition(n), SN10-11
12	2500.0	8.20	40.5	1.000	623	0.25	350	1000	6.00	2.86	626	16.44	10.10	6.00	16.10	elbow(o), SN11-12a
13	2000.0	7.80	36.6	1.011	571	0.45	350	800	6.00	2.29	567	14.01	16.50	6.10	22.50	wye main(p), transition(q), SN12a-13a
14	1500.0	7.30	32.1	1.021	511	0.45	300	800	6.00	2.67	520	13.40	14.40	6.10	20.60	wye main(r), transition(s), SN13a-14a
15	1000.0	6.60	26.2	1.018	439	0.45	300	550	6.00	1.83	439	10.35	11.80	6.10	17.90	wye main(t), transition(u), SN14a-15a
16	500.0	5.50	18.2	0.992	340	0.45	300	550	6.00	1.83	439	10.35	8.20	6.00	14.10	wye main(v), transition(w), SN15a-16a
17	250.0	3.74	8.4	1.003	292	0.50	275	270	3.00	0.98	298	3.32	4.20	3.00	7.20	dovetail(x), rectangular-round(y), SN16a-17a
18	0.0	0.00	0.0	0.000	0	0.00	0	0	0.00	0.00	0	0.00	0.00	0.00	0.00	flexible duct(ε =2.0, D=300), SN17a-diffuser
19	0.0	0.00	0.0	0.000	0	0.00	0	0	0.00	0.00	0	0.00	0.00	0.00	0.00	★for deleting all inputs
20	0.0	0.00	0.0	0.000	0	0.00	0	0	0.00	0.00	0	0.00	0.00	0.00	0.00	
21	0.0	0.00	0.0	0.000	0	0.00	0	0	0.00	0.00	0	0.00	0.00	0.00	0.00	
											Total:	340.20	224.4	116.5	340.9	→ Copied to fig 5 automatically

(5) **fig5**:Complete the inputs in Table 3~Table 5, and SAVE first before PRINT1 or PRINT2.

①The calculated Ptr=644Pa is total pressure loss. If you want to calculate static pressure loss (Ps), then Ps = Ptr - Pv @AHU outlet =645-57=588Pa (see p6/6 Table 2 & 4).

②Input fan total pressure (PT). Ptr≦PT≦1.05Ptr is recommended.

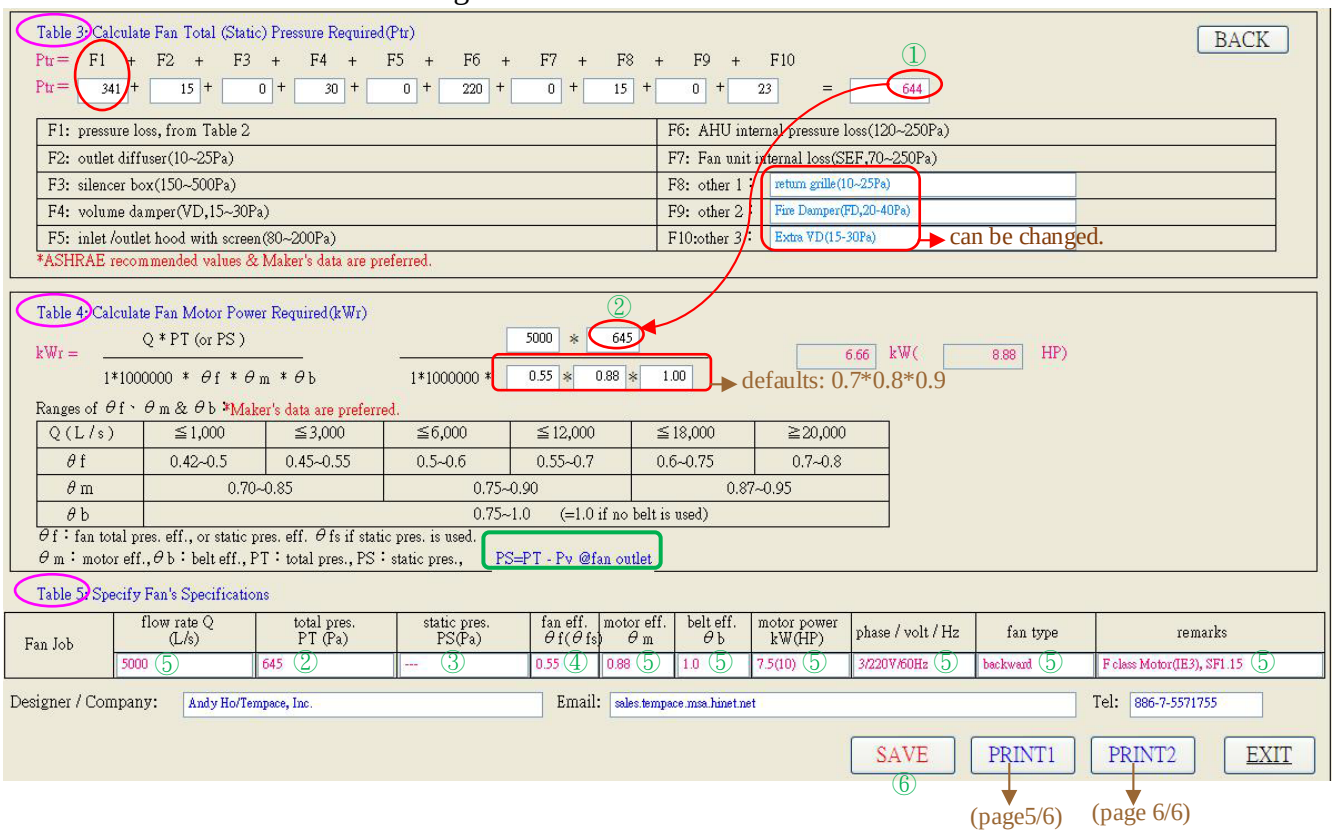
③Input fan static pressure (PS) value if Ps is used. Psr≦PS≦1.05Psr is recommended.

④Input θfs (static pres. eff.) value if fan static pressure (PS) is used.

⑤Input concerned information in Table 5.

⑥Press SAVE first before Print out.

fig 5



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PRINT 1

Table 1 : Duct Basic Analysis Data (eDUCT)

Customer: eDuct Software **Project:** User's Manual Example,HVAC system **Date:** 2020/04/06

	Must Inputs				Option Input		Outputs							Remarks
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
SN	Q L/s	V m/s	ε mm	T ℃	RH %	ρ kg/m3	Pv Pa	△PL Pa/m	D mm	ν m²/s	ε /D	Re	f	Noted by Designer FN & SN refer to attached duct diagram
1	2200.0	8.00	0.090	20.0	0.1	1.204	38.5	1.016	592	0.00001508	0.000152	313988.2	0.0156	return grille-1 transition(a)
2	2200.0	8.00	0.090	20.0	0.1	1.204	38.5	1.016	592	0.00001508	0.000152	313988.2	0.0156	ellow (b), SN1-2
3	2200.0	8.00	0.090	20.0	0.1	1.204	38.5	1.016	592	0.00001508	0.000152	313988.2	0.0156	ellbow(c), SN2-3
4	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	transition(d), wye main(e), SN3-4
5	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	ellbow(f), SN4-5
6	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	ellbow(g), SN5-6
7	4400.0	9.40	0.090	20.0	0.1	1.204	53.2	0.999	772	0.00001508	0.000117	481334.7	0.0145	ellbow(h), SN6-7, transition(i), SN7-AHU
8	5000.0	9.70	0.090	20.0	0.1	1.204	56.6	1.001	810	0.00001508	0.000111	521228.1	0.0143	transition(j), AHU-SN8
9	5000.0	9.70	0.090	20.0	0.1	1.204	56.6	1.001	810	0.00001508	0.000111	521228.1	0.0143	ellbow(k), SN8-9
10	5000.0	9.70	0.090	20.0	0.1	1.204	56.6	1.001	810	0.00001508	0.000111	521228.1	0.0143	ellbow(l), SN9-10
11	2500.0	8.20	0.090	20.0	0.1	1.204	40.5	1.000	623	0.00001508	0.000144	338870.6	0.0154	wye main(m), transition(n), SN10-11
12	2500.0	8.20	0.090	20.0	0.1	1.204	40.5	1.000	623	0.00001508	0.000144	338870.6	0.0154	ellbow(o), SN11-12a
13	2000.0	7.80	0.090	20.0	0.1	1.204	36.6	1.011	571	0.00001508	0.000158	295610.1	0.0158	wye amin(p), transition(q), SN12a-13a
14	1500.0	7.30	0.090	20.0	0.1	1.204	32.1	1.021	511	0.00001508	0.000176	247664.6	0.0163	wye main9r), transition(s), SN13a-14a
15	1000.0	6.60	0.090	20.0	0.1	1.204	26.2	1.018	439	0.00001508	0.000205	192277.7	0.0170	wye main(t), transition(u), SN14a-15a
16	500.0	5.50	0.090	20.0	0.1	1.204	18.2	0.992	340	0.00001508	0.000265	124114.7	0.0185	wye main(v), transition(w), SN15a-16a
17	250.0	3.74	2.000	20.0	0.1	1.204	8.4	1.003	292	0.00001508	0.006856	72370.7	0.0347	dovetail(x), rectangular-round (y), SN 16a-17a
18														flexiable duct(ε =2.0, D=300), SN17a-diffuser
19														
20														
21														

Note 1: Standard air (20℃ & 0%RH or 1.204 kg/m3) is normally adopted for common HVAC ducts.
Note 2: common ε values : PVC(0.04) ' galvanized steel round(0.09) ' galvanized steel spiral(0.12) ' flexible aluminium, 100% extended(2.0)
Note 3: Symbols in Table 1 ~ Table 5 :
FN : fitting No. SN : serial No. Q : flowrate(L/s) V : velocity(m/s) ε : absolute roughness(mm) T : temperature(℃) RH : relative humidity(%RH)
ρ : density (kg/m3) Pv : velocity pressure(Pa) △PL : friction loss(Pa/m) D : diameter(mm) ν : kinematic viscosity(m2/s)
ε /D: relative roughness (-) Re : Reynolds No.(-) f : friction factor(-) Cs : section fitting loss coefficient(-) H : known duct height(mm)
W : specified duct width(mm) L : duct length(m) Ras : aspect ratio(W/H ≦ 5) De : equivalent diameter of rectangular duct As : duct surface area(m^2,=(H+W)*L*2.03)
Pf : fitting pressure loss(Pa,=Cs*Pv) Pm : main duct pressure loss(Pa,= △PL*L) Pt : total pressure loss(Pa,=Pf+Pm) PT : fan total pressure.(Pa)
PS : fan static pres.(Pa) θf : fan total pres. eff. θfs : fan static pres. eff. θm : motor eff. θb : belt eff. Q: specified flow rate(L/s)

PRINT 2

Table 2 : Duct Size & Utmost Duct Pressure Loss (eDUCT)

	Copied From Table 1					Inputs				Outputs						Remarks
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SN	Q L/s	V m/s	Pv Pa	ΔPL Pa/m	D mm	Cs	H mm	W mm	L m	Ras W/H	De mm	As m²	Pf Pa	Pm Pa	Pt Pa	Noted by Designer FN & SN refer to attached duct diagram
1	2200.0	8.00	38.5	1.016	592	0.20	350	900	1.00	2.57	597	2.50	7.7	1.0	8.7	return grille-1 transition(a)
2	2200.0	8.00	38.5	1.016	592	0.25	350	900	3.00	2.57	597	7.60	9.6	3.0	12.7	ellow (b), SN1-2
3	2200.0	8.00	38.5	1.016	592	0.25	350	900	12.00	2.57	597	30.50	9.6	12.2	21.8	ellbow (c), SN2-3
4	4400.0	9.40	53.2	0.999	772	0.45	400	1400	6.00	3.50	781	21.90	23.9	6.0	29.9	transition(d), wye main(e), SN3-4
5	4400.0	9.40	53.2	0.999	772	0.25	400	1400	24.00	3.50	781	87.70	13.3	24.0	37.3	ellbow (f), SN4-5
6	4400.0	9.40	53.2	0.999	772	0.25	400	1400	3.00	3.50	781	11.00	13.3	3.0	16.3	ellbow (g), SN5-6
7	4400.0	9.40	53.2	0.999	772	0.45	400	1400	1.00	3.50	781	3.70	23.9	1.0	24.9	ellbow (h), SN6-7, transition(i), SN7-AHU
8	5000.0	9.70	56.6	1.001	810	0.20	450	1300	3.00	2.89	808	10.70	11.3	3.0	14.3	transition(j), AHU-SN8
9	5000.0	9.70	56.6	1.001	810	0.25	450	1300	6.00	2.89	808	21.30	14.2	6.0	20.2	ellbow (k), SN8-9
10	5000.0	9.70	56.6	1.001	810	0.25	450	1300	12.00	2.89	808	42.60	14.2	12.0	26.2	ellbow (l), SN9-10
11	2500.0	8.20	40.5	1.000	623	0.45	350	1000	12.00	2.86	626	32.90	18.2	12.0	30.2	wye main(m), transition(n), SN10-11
12	2500.0	8.20	40.5	1.000	623	0.25	350	1000	6.00	2.86	626	16.40	10.1	6.0	16.1	ellbow (o), SN11-12a
13	2000.0	7.80	36.6	1.011	571	0.45	350	800	6.00	2.29	567	14.00	16.5	6.1	22.5	wye amin(p), transition(q), SN12a-13a
14	1500.0	7.30	32.1	1.021	511	0.45	300	800	6.00	2.67	520	13.40	14.4	6.1	20.6	wye main9r), transition(s), SN13a-14a
15	1000.0	6.60	26.2	1.018	439	0.45	300	550	6.00	1.83	439	10.40	11.8	6.1	17.9	wye main(t), transition(u), SN14a-15a
16	500.0	5.50	18.2	0.992	340	0.45	300	550	6.00	1.83	439	10.40	8.2	6.0	14.1	wye main(v), transition(w), SN15a-16a
17	250.0	3.74	8.4	1.003	292	0.50	275	270	3.00	0.98	298	3.30	4.2	3.0	7.2	dovetail(x), rectangular-round(y), SN 16a-17a
18																flexiable duct(ε =2.0, D=300), SN17a-diffuser
19																
20																
21																
											Total:	340.3	224.4	116.5	340.9	

Table 3: Calculate Fan Total (Static) Pressure Required (Ptr)

Ptr = F1 + F2 + F3 + F4 + F5 + F6 + F7 + F8 + F9 + F10

341 + 15 + + 30 + + 220 + + 15 + + 23 = 644 Pa

F1: pressure loss, from Table 2	F6: AHU internal pressure loss(120~250Pa)
F2: outlet diffuser(10~25Pa)	F7: Fan unit internal loss(SEF,70~250Pa)
F3: silencer box(150~500Pa)	F8: other 1 : return grille(10~25Pa)
F4: volume damper(VD,15~30Pa)	F9: other 2 : Fire Damper(FD,20-40Pa)
F5: inlet / outlet hood with screen(80~200Pa)	F10: other 3 : Extra VD(15-30Pa)

*ASHRAE recommended values & Maker's data are preferred.

Table 4: Calculate Fan Motor Power Required (kWr)

$$kWr = \frac{Q * PT \text{ (or PS)}}{1*10^6 * \theta f * \theta m * \theta b} = \frac{5000 * 645}{1 * 10^6 * 0.55 * 0.88 * 1.00} = 6.66 \text{ kW (8.88 HP)}$$

Ranges of θf、θm & θb : *Maker's data are preferred.

Q (L/s)	≦ 1,000	≦ 3,000	≦ 6,000	≦ 12,000	≦ 18,000	≧ 20,000
θf	0.42~0.5	0.45~0.55	0.5~0.6	0.55~0.7	0.6~0.75	0.7~0.8
θm	0.70~0.85		0.75~0.90		0.87~0.95	
θb	0.75~1.0 (=1.0 if no belt is used)					

θf : fan total pres. eff., or static pres. eff. θfs if static pres. is used

θm : motor eff., θb : belt eff., PT : total pres., PS : static pres. PS=PT - Pv @fan outlet

588=645-57

Table 5: Specify Fan's Specifications

Fan Job	flow rate Q (L/s)	total pres. PT (Pa)	static pres. PS (Pa)	fan eff. θf(θfs)	motor eff. θm	belt eff. θb	motor power kW(HP)	phase / volt / Hz	fan type	remarks
	5000	645	588	0.55 (0.5)	0.88	1.0	7.5(10)	3/220V/60Hz	backward	F class Motor(IE3), SF1.15

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