

WORKSHEET FOR RESIDENTIAL AIR SYSTEM DESIGN

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**Wallet card
photocopy**

Inspection Authority: _____
Signature: _____
Date: / /

Designer/Signature: _____
Phone: () _____ Fax () _____
Date: / /

Submitted For: (Owner)

Name _____

Address _____

City _____ Prov _____

Postal code _____

Phone () _____ Fax () _____

By: (Contractor)

Name _____

Address _____

City _____ Prov _____

Postal code _____

Phone () _____ Fax () _____

Designed Equipment: (Heating)

Gas furnace	
Oil furnace	
Propane furnace	
Electric furnace	
Heat pump	
Water coil & blower	

Designed Equipment: (Accessories)

Electronic air cleaner	
Pleated air cleaner	
Electrostatic air filter	
Dry media filter (thickness) "	
Merv _____ filter	
Water heating coil	

Designed Equipment: (Cooling)

Indoor coil	
Outdoor Unit	
Air handler	
Other	

Electric heating coil

Other

Ventilation System (Integrated)

System type :

Mixed air temperature °F

Forms available from: HRAI * 2350 Matheson Blvd. East. * Suite 101 * Mississauga, Ontario * L4W 5G9

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PART A - DESIGN LOAD SPECIFICATIONS

A.1 Sub Total Heat Loss	Btuh.	A.3 Total Heat Loss (A.1 + A.2)	Btuh.
A.2 Ventilation Heat Loss	Btuh.		
A.4 Sub Total Heat Gain	Btuh.	A.6 Total Heat Gain (A.4 + A.5)	Btuh.
A.5 Ventilation Heat Gain	Btuh.		
A.7 Volume of House:	(Heated Area) X (Average Ceiling Height)		cu ft.
A.8 Ventilation Flow Rate:	As per Heat Loss/Gain Worksheet		cfm.

PART B – EQUIPMENT SELECTION

Heating Equipment:		Cooling Equipment:	
Make	Model	Make	Model (Outdoor Unit)
Fuel Type: <input type="checkbox"/> Gas <input type="checkbox"/> Oil <input type="checkbox"/> Electricity <input type="checkbox"/> Other		Make	Model (Indoor Unit)
B.1 Heating Output (Minimum 100% - of A.3)	Btuh.	Cooling Medium: <input type="checkbox"/> DX <input type="checkbox"/> Chilled Water <input type="checkbox"/> Other	
B.2 Approved Temperature Rise/range	°F.	B.5 Cooling Output (80% - 125% of A.6)	Btuh. Tons
B.3 Equipment External Static Pressure	in. W.C.	B.6 Manufacturers Flow Rate/Ton	(cfm/ton)
B.4 Heating Air Flow Rate (blower specs)	cfm	B.7 Cooling Air Flow Rate.	
		Target Air Flow rate = B.5 X B.6	cfm
Speed setting:	Adjustment:	Actual Air Flow Rate (blower specs)	
		B.8 Coil Pressure Drop, in. W.C.	Dry: Wet:
		Speed Setting:	Adjustment:

PART C – AIR DISTRIBUTION & PRESSURE

C.1 Circulation Air Flow Rate (A.7 x 0.025)	cfm	C.5 Calculated Heating Temperature Rise [B.1 ÷ (B.4 x 1.08)]	°F
C.2 System Design Air Flow Rate (highest of B.4, B.7, C.1)	cfm	C.6 Filter Pressure Drop	in. W.C.
C.3 Cooling Airflow Proportioning Factor Calculate to 4 decimal places (B.7 ÷ A.4)	cfm/Btuh	C.7 Coil Pressure Drop (B.8)	in. W.C.
C.4 Heating Airflow Proportioning Factor Calculate to 4 decimal places (C.2 ÷ A.1) <input type="checkbox"/> or (B.4 ÷ A.1) <input type="checkbox"/>	cfm/Btuh	C.8 Total of Pressure Drop (C.6 + C.7)	in. W.C.
		C.9 Available Design Pressure (B.3 – C.8) or Selected Design Pressure	in. W.C.

Note: When furnace standard filter is replaced, subtract its pressure drop from the replacement filter and record on line C.6

PART D - DETERMINING ROOM AND FLOOR DESIGN FLOW RATES

D.1 Floor								
D.2 Room								
D.3 Cooling load (Btuh)								
D.4 Room cooling flow rate (D.3 x C.3)								
D.5 Heating load (Btuh)								
D.6 Room heating flow rate (D.5 x C.4)								
D.7 Number of outlets per room								
D.8 Floor supply air flow rates (greatest airflow heating or cooling)								

PART D - CONTINUED

D.1								
D.2								
D.3								
D.4								
D.5								
D.6								
D.7								
D.8								

PART E - INLET FLOW RATES

Floor level (Location)	Basement (50% D.8 Max)	1st floor (Sum of D.8 Min)	2nd floor (Sum of D.8 Min)	3rd floor (Sum of D.8 Min)	Total = (C.2) (System cfm)
E.1 Floor return air flow rate					
E.2 Minimum number of openings					
E.3 Actual number of openings					
E.4 Actual cfm per opening (E.1 ÷ E.3)					

Note: After location of supply outlets and return inlets are determined, produce preliminary drawing.

PART F - SUMMARY OF TOTAL EFFECTIVE LENGTHS FOR RETURN DUCTS

Inlet No	Equipment Connection (Group 1)	Trunk To Drop Connection (Group 1)	Trunk Transitions (Group 2)	Trunk Fittings (Group 2)	Duct To Joist (Group 3)	Turbulence Effect	Stud To Joist (Group 4)	Grille Opening To Stud (Group 4)	Measured Length (ft)	Branch Effective Length (ft)

PART G - DUCT DESIGN PRESSURE

G.1 (Return Branch Longest Effective Length_____ft).

G.2 **R/A Plenum Pressure:**
 Available Design Pressure (Line C.9) x Return Air Apportioning Factor (Appendix C (C3))
 () x () = _____in. W.C. (Record Line H.8)

G.3 **S/A Plenum Pressure:**
 Available Design pressure (Line C.9) - R/A Plenum Pressure
 () - () = _____in. W.C. (Record Line J.7)

