Table 5

Infiltration Evaluation

Winter Air Changes Per Hour

Floor Area	900 or less	900-1500	1500-2100	over 2100
Best	0.4	0.4	0.3	0.3
Average	1.2	1.0	0.8	0.7
Poor	2.2	1.6	1.2	1.0
For each fire place add:			Best 0.1	Average 0.2 / Poor 0.6

Summer Air Changes Per Hour

Floor Area	900 or less	900-1500	1500-2100	over 2100
Best	0.2	0.2	0.2	0.2
Average	0.5	0.5	0.4	0.4
Poor	0.8	0.7	0.6	0.5

Envelope Evaluation

Best - Continuous infiltration barrier, all cracks and penetrations sealed, tested leakage of windows and doors less then 0.25 CFM per running foot of crack, vents and exhaust fans dampered, recessed ceiling lights gasketed or taped, no combustion air required or combustion air from outdoors, no duct leakage.

Average - Plastic vapor barrier, major cracks and penetrations sealed, tested leakage of windows and doors between 0.25 and 0.50 CFM per running foot of crack, electrical fixtures which penetrate the envelope not taped or gasketed, vents and exhaust fans dampered, combustion air from indoors, intermittent ignition and flue damper, some duct leakage to unconditioned space.

Poor - No infiltration barrier or plastic vapor barrier, no attempt to seal cracks and penetrations, tested leakage of windows and doors greater than 0.50 CFM per running foot of crack, vents and exhaust fans not dampered, combustion air from indoors, standing pilot, no flue damper, considerable duct leakage to unconditioned space.

Fireplace Evaluation

Best - Combustion air from outdoors, tight glass doors and damper.
Average - Combustion air from indoors, tight glass doors or damper.
Poor - Combustion air from indoors, no glass doors or damper.

Notes To Table 5

1. One, two or three story, or split level; any wind exposure.
2. Floor plan aspect ratio between 1:1 and 3:1.
3. Glass plus door areas between 10% and 30% of the wall area.
4. Allowance for one kitchen and two bathroom exhaust fans, dryer vent, recessed lighting fixtures, pipe and duct penetrations.
5. Refer to Appendix 5 for a more comprehensive air change calculation procedure.

Table 6

Rating and Temperature Swing Multiplier (RSM)

Method Used to Select Equipment	Summer Design	Temp. Swing 4.5	Temp. Swing 3.0
Selection Made at the Actual Summer Design Condition Using Manufacturer's Performance Data		0.90	1.00
Selection Made at the ARI Standard Rating Design Condition	85-90	0.85	0.95
	95	0.90	1.00
	100	0.95	1.05
	105	1.00	1.10
	110	1.05	1.15
Use this table in conjunction with calculation Procedure D.			

Table 7A

Duct Loss Multipliers

Case I - Supply Air Temperatures Below 120°F Duct Location and Insulation Value Exposed to Outdoor Ambient	**Duct Loss Multipliers** Winter Design Below 15°F	 Winter Design Above 15°F
Attic, Garage, Exterior Wall, Open Crawl Space - None	.30	.25
Attic, Garage, Exterior Wall, Open Crawl Space - R2	.20	.15
Attic, Garage, Exterior Wall, Open Crawl Space - R4	.15	.10
Attic, Garage, Exterior Wall, Open Crawl Space - R6	.10	.05
Enclosed In Unheated Space		
Vented or Unvented Crawl Space or Basement - None	.20	.15
Vented or Unvented Crawl Space or Basement - R2	.15	.10
Vented or Unvented Crawl Space or Basement - R4	.10	.05
Vented or Unvented Crawl Space or Basement - R6	.05	.00
Duct Buried In or Under Concrete Slab		
No Edge Insulation	.25	.20
Edge Insulation R Value = 3 to 4	.15	.10
Edge Insulation R Value = 5 to 7	.10	.05
Edge Insulation R Value = 7 to 9	.05	.00
Case II - Supply Air Temperatures Above 120°F Duct Location and Insulation Value Exposed to Outdoor Ambient	 Winter Design Below 15°F	 Winter Design Above 15°F
Attic, Garage, Exterior Wall, Open Crawl Space - None	.35	.30
Attic, Garage, Exterior Wall, Open Crawl Space - R2	.25	.20
Attic, Garage, Exterior Wall, Open Crawl Space - R4	.20	.15
Attic, Garage, Exterior Wall, Open Crawl Space - R6	.15	.10
Enclosed In Unheated Space		
Vented or Unvented Crawl Space or Basement - None	.25	.20
Vented or Unvented Crawl Space or Basement - R2	.20	.15
Vented or Unvented Crawl Space or Basement - R4	.15	.10
Vented or Unvented Crawl Space or Basement - R6	.10	.05
Duct Buried In or Under Concrete Slab		
No Edge Insulation	.30	.25
Edge Insulation R Value = 3 to 4	.20	.15
Edge Insulation R Value = 5 to 7	.15	.10
Edge Insulation R Value = 7 to 9	.10	.05

Table 7B

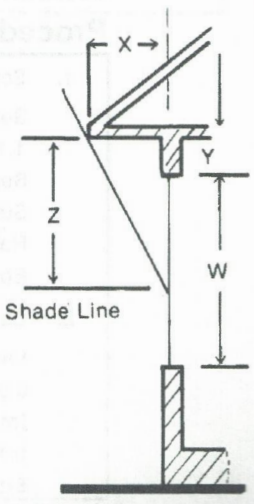
Duct Gain Multipliers

Duct Location and Insulation Value	Duct Gain Multiplier
Exposed to Outdoor Ambient	
Attic, Garage, Exterior Wall, Open Crawl Space - None	.30
Attic, Garage, Exterior Wall, Open Crawl Space - R2	.20
Attic, Garage, Exterior Wall, Open Crawl Space - R4	.15
Attic, Garage, Exterior Wall, Open Crawl Space - R6	.10
Enclosed In Unconditioned Space	
Vented or Unvented Crawl Space or Basement - None	.15
Vented or Unvented Crawl Space or Basement - R2	.10
Vented or Unvented Crawl Space or Basement - R4	.05
Vented or Unvented Crawl Space or Basement - R6	.00
Duct Buried In or Under Concrete Slab	
No Edge Insulation	.10
Edge Insulation R Value = 3 to 4	.05
Edge Insulation R Value = 5 to 7	.00
Edge Insulation R Value = 7 to 9	.00

Table 8

Shaded Glass Area

	Window	#1	#2	#3	#4
A. Direction Wall Faces	Exposure				
B. Overhang Dimension	X in Ft.				
C. Shade Line Multiplier	See Table				
D. Distance Between Overhang & Shade Line (Z in Ft.)	(BXC) =				
E. Distance Between Overhang & Top of Window	Y in Ft.				
F. Shaded Height of Glass (Ft.)	(D-E) =				
G. Height of Window	W in Ft.				
H. Unshaded Height of Glass (Ft.)	(G-F) =				
I. Width of Window	(Feet)				
J. Area, Shaded Glass (Sq. Ft.)	(FXI) =				
K. Area, Unshaded Glass (Sq. Ft.)	(HXI) =				



Shade Line Multipliers
Degrees North Latitude

Direction Window Faces	25	30	35	40	45	50
E or W	0.83	0.83	0.82	0.81	0.80	0.79
SE or SW	1.89	1.63	1.41	1.25	1.13	1.01
South	10.1	5.40	3.55	2.60	2.05	1.70

Use Table 8 to determine the square feet of shaded and unshaded glass areas beneath permanent external shading devices such as roof overhangs. A separate calculation is required for each window.

The total heat gain for a window that is partially shaded is equal to the sum of the heat gain through the shaded and unshaded areas. The heat gain through the shaded area is equal to the shaded area multiplied by the Table 3 heat transfer multiplier (HTM) for north (or external shading) glass. The heat gain through the unshaded area is equal to the unshaded area multiplied by the Table 3 heat transfer multiplier (HTM) for glass that has the same exposure as the window that is under consideration.

Shaded areas are not calculated for windows that face north, north-east or north-west because these exposures are not subjected to direct sunlight.

Refer to Section 5-2 for an example calculation.