

Enthalpy Wheel Performance Calculation

Design Supply CFM _____ Design Return CFM (from the Bldg.) _____

Divide the Largest CFM by the Smallest CFM = Ratio _____

If the Return CFM is less than the Supply CFM then divide the Return by the Supply = Factor _____

1. Intersect the Supply CFM with the Ratio on the Efficiency chart = Base Efficiency _____

a. If the Supply CFM is equal to or less than the Return CFM then the Base and Net Efficiency are the same.

Net Efficiency = _____

b. If the Supply CFM is greater than the Return CFM divide the Base Efficiency by the Factor this will be the

Net Efficiency = _____

2. Use the Net Efficiency in order to calculate the conditions coming off the wheel.

Example of (a)

Supply CFM = 5000 Return CFM = 5500

a. $5500 \text{ cfm} / 5000 \text{ cfm} = 1.10 \text{ ratio}$

b. 5000 cfm at a 1.10 ratio is 0.81 Base Efficiency.

c. The Net Efficiency is equal to the base.

Example of (b)

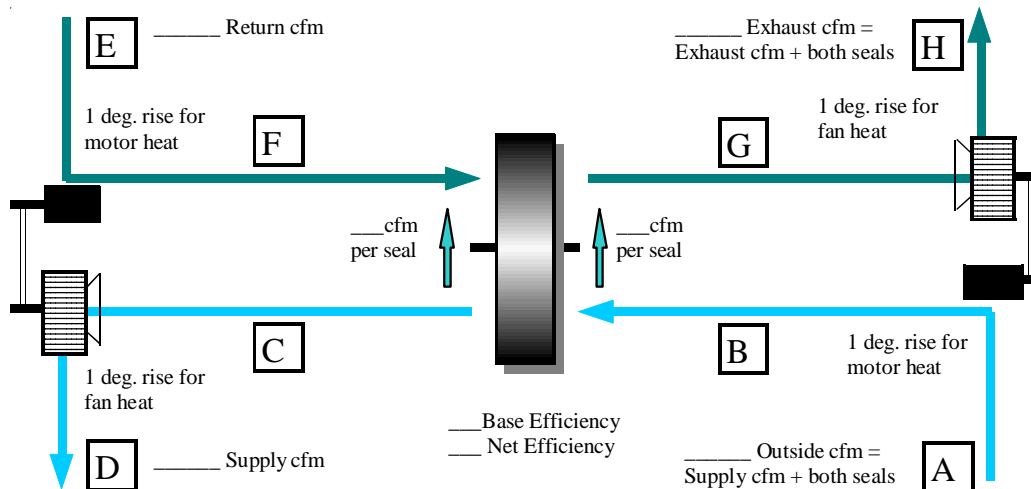
Supply CFM = 5000 Exhaust CFM = 4545

a. $5000 \text{ cfm} / 4545 \text{ cfm} = 1.10 \text{ ratio}$

b. $4545 \text{ cfm} / 5000 \text{ cfm} = 0.91 \text{ factor}$

c. 5000 cfm at a 1.10 ratio is 0.81 Base Efficiency.

d. Supply CFM is greater than the return CFM. Multiply the base efficiency of 0.81 by the factor of 0.91 = 0.74 net efficiency.



The Enthalpy Wheel Seal is designed to limit cross contamination by using the following steps:

- 1) The return air damper is set for the external static pressure.
- 2) The increased internal negative pressure allows the seal to bleed across the surface of the wheel over the exhaust air.
- 3) The CFM bleed is only pulled from the outside air deposited into the exhaust fan.
- 4) This does not affect the design Supply or Return CFM for the building.

Enthalpy Rotor seal for each side:	
3820 = 25 CFM	6895 = 75 CFM
4830 = 25 CFM	7812 = 100 CFM
5840 = 50 CFM	8815 = 100 CFM
5855 = 50 CFM	9617 = 125 CFM
6875 = 75 CFM	9620 = 125 CFM

COOLING PERFORMANCE

	A	B	C	D	E	F	G	H
db	95.0	96.0	82.0	83.0	75.0	76.0	90.0	91.0
w b	77.9	78.2	68.0	68.3	62.4	62.8	74.1	74.3
%RH	47.1	45.7	49.0	47.5	49.7	48.1	47.8	46.3
btu/lbs	41.4	41.6	32.3	32.6	28.1	28.4	37.6	37.9
gr/lbs	118.0	118.0	80.8	80.8	64.8	64.8	102.0	102.0
	OA	Motor	Rotor	SA	RA	Motor	Rotor	XA
	EAT	LAT	LAT	LAT	EAT	LAT	LAT	LAT

HEATING PERFORMANCE

	A	B	C	D	E	F	G	H
db	0.0	1.0	50.0	51.0	70.0	71.0	22.0	23.0
w b	-1.5	-0.7	41.0	41.5	52.9	53.3	19.9	20.6
%RH	50.0	48.1	44.4	42.8	29.9	28.9	70.8	67.5
btu/lbs	0.4	0.7	15.7	15.9	21.9	22.1	7.1	7.3
gr/lbs	2.8	2.8	23.7	23.7	32.7	32.7	11.8	11.8
	OA	Motor	Rotor	SA	RA	Motor	Rotor	XA
	EAT	LAT	LAT	LAT	EAT	LAT	LAT	LAT

(A) - (D) $\text{btu/lbs} \times 4.5 \times \text{cfm}/12000 = \text{Tons Saved}$
 ex. $41.4 - 31.9 \times 4.5 \times 10000/12000 = 35.6 \text{ Tons Saved}$

(D) - (A) $\text{db} \times 1.085 \times \text{cfm} = \text{BTUH Saved}$
 ex. $54.5 - 0 \times 1.085 \times 10000 = 591325 \text{ BTUH Saved}$

1. Use the calculated Net Efficiency from above. (ex. 70.0% = 0.70)
2. Subtract the OA db (A) - RA db (E) then multiply by the net Efficiency. This is the effect the wheel has on the db - temperature absorbed.
3. Subtract the effect from the OA db (A) = (C) db Rotor LAT.
4. Add the effect to the RA db (E) = (G) db Rotor LAT.
5. Subtract the OA gr/lbs (A) - RA gr/lbs (E) then multiply by the net efficiency. This is the effect the wheel has on the gr/lbs - moisture absorbed.
6. Subtract the effect from the OA gr/lbs (A) = (C) gr/lbs Rotor LAT.
7. Add the effect to the RA gr/lbs (E) = (G) gr/lbs Rotor LAT

1. Use the calculated Net Efficiency from above.
2. Subtract the RA db (E) - OA db (A) then multiply by the net Efficiency. This is the effect the wheel has on the db - temperature absorbed.
3. Add the effect to the OA db (A) = (C) db Rotor LAT.
4. Subtract the effect from the RA db (E) = (G) db Rotor LAT.
5. Subtract the RA gr/lbs (E) - OA gr/lbs (A) - then multiply by the net efficiency. This is the effect the wheel has on the gr/lbs - moisture absorbed.
6. Add the effect to the OA gr/lbs (A) = (C) gr/lbs Rotor LA
7. Subtract the effect from the RA gr/lbs (E) = (G) gr/lbs Rotor LAT.

EFFICIENCY OF THE WHEEL AT WHEEL RATIO

Model No.	CFM	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
3820	1,500	0.82	0.85	0.88	0.91	0.92	0.94	0.95	0.96
	1,750	0.80	0.83	0.87	0.90	0.91	0.93	0.94	0.95
	2,000	0.79	0.82	0.86	0.89	0.90	0.92	0.93	0.94
	2,250	0.77	0.80	0.84	0.87	0.89	0.91	0.93	0.94
	2,500	0.75	0.78	0.82	0.86	0.88	0.90	0.91	0.93
4830	2,500	0.82	0.85	0.88	0.91	0.92	0.94	0.95	0.96
	2,750	0.80	0.83	0.87	0.90	0.91	0.93	0.94	0.95
	3,000	0.79	0.82	0.86	0.89	0.90	0.92	0.93	0.94
	3,250	0.78	0.81	0.85	0.88	0.89	0.91	0.92	0.93
	3,500	0.77	0.80	0.84	0.87	0.89	0.90	0.91	0.92
5840	3,500	0.82	0.86	0.88	0.91	0.92	0.94	0.95	0.95
	3,750	0.81	0.85	0.88	0.90	0.92	0.94	0.95	0.95
	4,000	0.80	0.84	0.87	0.89	0.91	0.93	0.94	0.94
	4,250	0.80	0.84	0.86	0.89	0.91	0.92	0.93	0.94
	4,500	0.78	0.83	0.86	0.89	0.91	0.92	0.93	0.94
5855	4,750	0.78	0.82	0.85	0.88	0.90	0.92	0.93	0.94
	5,000	0.77	0.81	0.85	0.88	0.89	0.91	0.93	0.94
	5,500	0.77	0.81	0.84	0.87	0.89	0.91	0.92	0.93
	5,750	0.76	0.80	0.83	0.86	0.89	0.91	0.92	0.93
	6,000	0.75	0.79	0.82	0.85	0.88	0.90	0.91	0.92
6875	7,000	0.77	0.81	0.85	0.88	0.89	0.91	0.93	0.94
	7,250	0.77	0.81	0.84	0.87	0.89	0.91	0.92	0.93
	7,500	0.76	0.80	0.83	0.86	0.89	0.91	0.92	0.93
	7,750	0.75	0.79	0.82	0.85	0.88	0.91	0.92	0.93
	8,000	0.75	0.79	0.82	0.85	0.88	0.90	0.91	0.92
6895	9,000	0.74	0.78	0.81	0.84	0.87	0.89	0.91	0.92
	9,250	0.73	0.77	0.80	0.83	0.86	0.88	0.89	0.90
	9,500	0.73	0.77	0.79	0.82	0.86	0.88	0.89	0.90
	9,750	0.72	0.76	0.78	0.81	0.86	0.91	0.92	0.93
	10,000	0.71	0.75	0.77	0.80	0.85	0.90	0.91	0.92
7812	11,000	0.74	0.79	0.83	0.86	0.88	0.90	0.92	0.93
	11,500	0.74	0.79	0.82	0.85	0.88	0.90	0.91	0.92
	12,000	0.73	0.78	0.81	0.84	0.86	0.89	0.91	0.92
	12,500	0.72	0.77	0.80	0.84	0.86	0.89	0.90	0.92
	13,000	0.71	0.77	0.80	0.83	0.86	0.88	0.90	0.91
8815	14,000	0.74	0.80	0.83	0.86	0.88	0.90	0.92	0.93
	14,500	0.74	0.79	0.82	0.85	0.87	0.90	0.91	0.92
	15,000	0.74	0.79	0.81	0.85	0.87	0.89	0.91	0.92
	15,500	0.73	0.78	0.81	0.84	0.86	0.88	0.90	0.91
	16,000	0.72	0.78	0.81	0.84	0.86	0.88	0.90	0.90
9617	16,000	0.75	0.80	0.83	0.86	0.88	0.91	0.93	0.94
	16,500	0.75	0.80	0.83	0.86	0.88	0.93	0.92	0.94
	17,000	0.75	0.80	0.83	0.86	0.88	0.90	0.92	0.95
	17,500	0.74	0.79	0.82	0.86	0.88	0.90	0.92	0.95
	18,000	0.73	0.78	0.83	0.85	0.87	0.90	0.93	0.95
9620	18,000	0.73	0.78	0.83	0.85	0.87	0.90	0.93	0.95
	19,000	0.72	0.78	0.83	0.84	0.87	0.89	0.91	0.92
	20,000	0.72	0.77	0.80	0.84	0.86	0.89	0.90	0.92
	21,000	0.70	0.75	0.79	0.83	0.85	0.88	0.90	0.91