

# 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 multiply the Base Efficiency by the Factor, this will now be the new

Net Efficiency = \_\_\_\_\_

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

## Example of (a)

Supply CFM = 10,000 Return CFM = 11,000

a. 11,000 cfm / 10,000 cfm = 1.10 ratio

b. 10,000 cfm at a 1.10 ratio is 0.75 Base Efficiency.

c. The Net Efficiency is equal to the base.

## Example of (b)

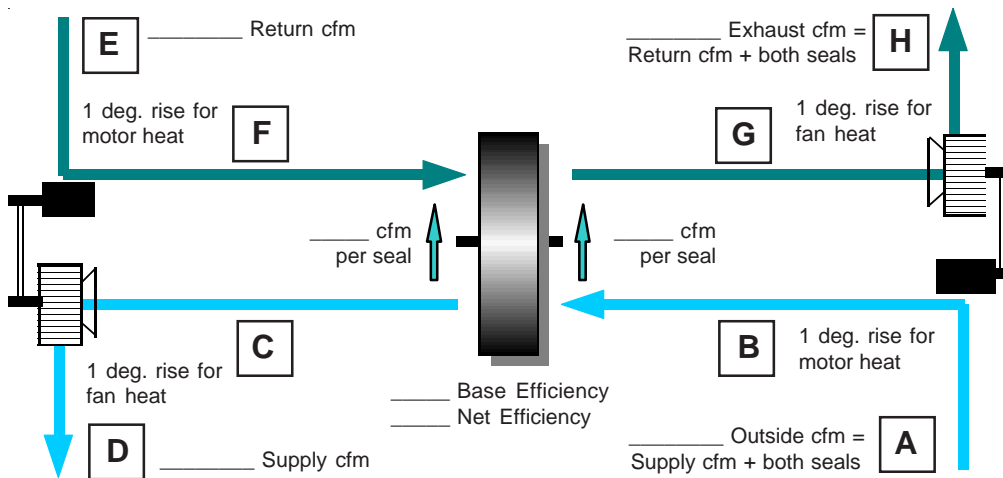
Supply CFM = 10,000 Exhaust CFM = 9900

a. 10,000 cfm / 9900 cfm = 1.01 ratio

b. 9900 cfm / 10,000 cfm = 0.99 factor

c. 10,000 cfm at a 1.01 ratio is 0.71 Base Efficiency.

d. Supply CFM is greater than the return CFM. Multiply the base efficiency of 0.71 by the factor of 0.99 = 0.70 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 EAT	Motor LAT	Rotor LAT	SA LAT	RA EAT	Motor LAT	Rotor LAT	XA 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 EAT	Motor LAT	Rotor LAT	SA LAT	RA EAT	Motor LAT	Rotor LAT	XA LAT

(A) - (D) btu/lbs x 4.5 x cfm/12000 = Tons Saved  
ex. 41.4 - 32.6 x 4.5 x 10000/12000 = 33.0 Tons Saved

(D) - (A) db x 1.085 x cfm = BTUH Saved  
ex. 51.0 - 0 x 1.085 x 10000 = 553350 BTUH Saved

1. Use the calculated Net Efficiency from above. (ex. 70.0% = 0.70)
2. Subtract the OA db (B) - RA db (F) 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 (B) = (C) db Rotor LAT.
4. Add the effect to the RA db (F) = (G) db Rotor LAT.
5. Subtract the OA gr/lbs (B) - RA gr/lbs (F) 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 (B) = (C) gr/lbs Rotor LAT.
7. Add the effect to the RA gr/lbs (F) = (G) gr/lbs Rotor LAT

1. Use the calculated Net Efficiency from above.
2. Subtract the RA db (F) - OA db (B) 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 (B) = (C) db Rotor LAT.
4. Subtract the effect from the RA db (F) = (G) db Rotor LAT.
5. Subtract the RA gr/lbs (F) - OA gr/lbs (B) - 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 (B) = (C) gr/lbs Rotor LA
7. Subtract the effect from the RA gr/lbs (F) = (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
<b>3820</b>	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
<b>4830</b>	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
<b>5840</b>	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
<b>5855</b>	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
<b>6875</b>	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
<b>6895</b>	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
<b>7812</b>	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
<b>8815</b>	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
<b>9617</b>	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
<b>9620</b>	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
	22,000	0.69	0.75	0.78	0.81	0.84	0.87	0.89	0.91

Note: If your CFM and/or Ratio fall between the numbers above you will have to prorate the efficiency. (i.e.: 2125 CFM at a 1.15 ratio will have a base efficiency of 0.83 or 83%)