

Some facts about cooling coils.

If we go through the cooling coil specifications of a project we come across a lot of facts to be followed by the manufacturer while manufacturing the coil. To name a few of them, Fins per inch; Copper tube thickness; Number of Rows; Test pressure etc....

We would like to highlight some facts which actually make the real difference in the capacity of a coil. We have used a few commonly used Air Quantities at Water inlet/ outlet: 44/55 deg F. Air Inlet DBT/WBT: 77/67 deg F. as the basis of our calculations.

Table 1:- We have tried to show the comparison between 10 FPI,11 FPI and 12 FPI. The percentage increase is between 4 to 5%.

Table: 1 - Fins per inch Changed

S No	Air Quantity (Cfm)	10 FPI (Tr)	11 FPI (Tr)	12 FPI (Tr)	% Variance 10 FPI-11 FPI	% Variance 11 FPI-12 FPI
1	1200	3.12	3.26	3.42	4.29%	4.67%
2	1600	3.83	4.00	4.21	4.25%	4.98%
3	2000	5.12	5.36	5.62	4.47%	4.62%
4	2500	6.54	6.84	7.17	4.38%	4.60%
5	3000	6.94	7.27	7.64	4.53%	4.84%
6	4000	10.2	10.7	11.2	4.67%	4.46%
7	5000	12.6	13.2	13.9	4.54%	5.03%

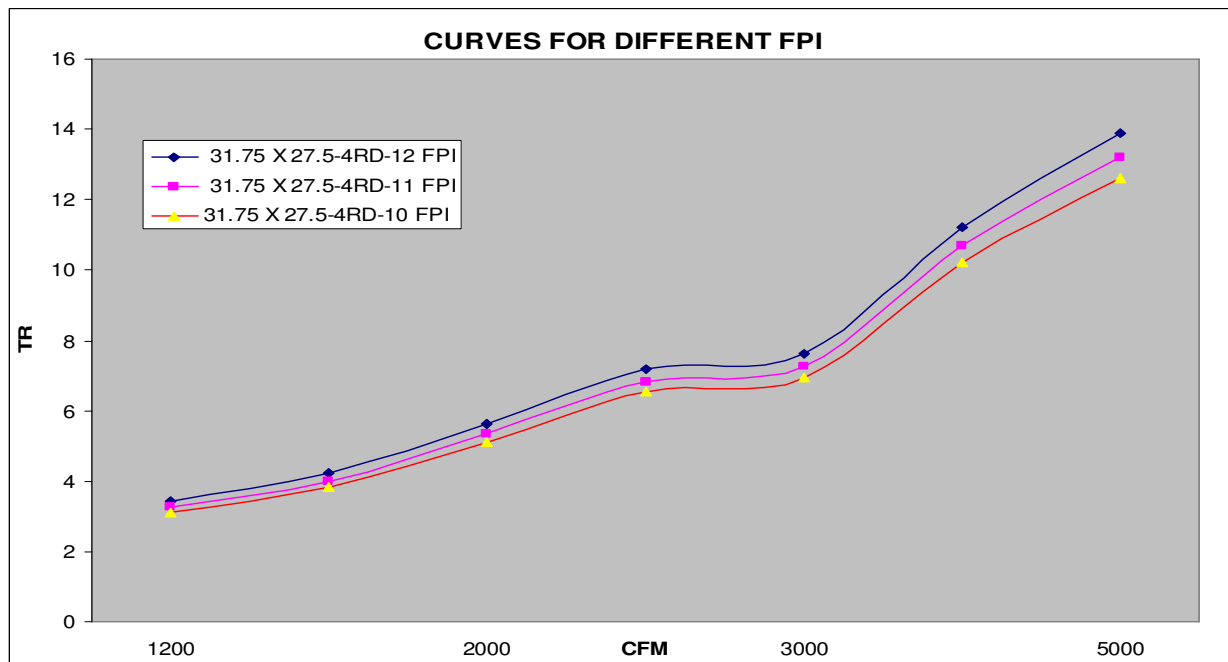
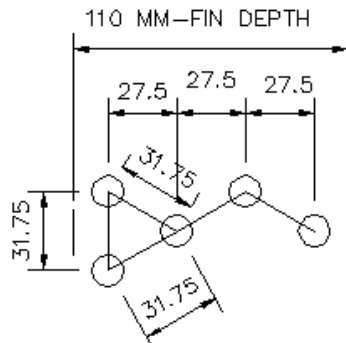


Table 2:- We have shown the variance when the tube thickness is changed. You will see that the increase is below 1%.

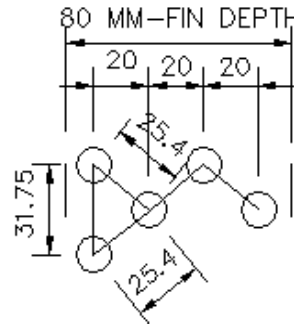
Table: 2 - Tube thickness is Changed (at 11 FPI)

S No	Air Quantity	Tube / Fin Thickness		% Variance
		0.35 / 0.15	0.41 / 0.15	
	1200	3.25	3.26	0.30%
	1600	4.00	4.00	0.00%
	2000	5.35	5.36	0.18%
	2500	6.82	6.84	0.29%
	3000	7.24	7.27	0.41%
	4000	10.60	10.70	0.93%
	5000	13.20	13.20	0.00%

Table 3 & 4 :- We have shown the variance in the Pitch between the tubes i.e. by changing the coil geometry from equilateral to non standard the fin depth gets reduced, hence capacity of coil, you will see from Non standard coil geometry to Equilateral coil geometry the increase is substantial between 11 to 12 %.



Equilateral coil geometry



Non standard coil geometry

Table: 3 - Pitch is Changed (at 11 FPI & 0.41/0.15 & 4 Row)

S No	Air Quantity	Pitch		% Variance
		31.75 x 20.0	31.75 x 27.5	
	1200	2.89	3.26	11.34%
	1600	3.54	4.00	11.50%
	2000	4.74	5.36	11.56%
	2500	6.05	6.84	11.54%
	3000	6.40	7.27	11.96%
	4000	9.43	10.7	11.86%
	5000	11.7	13.2	11.36%

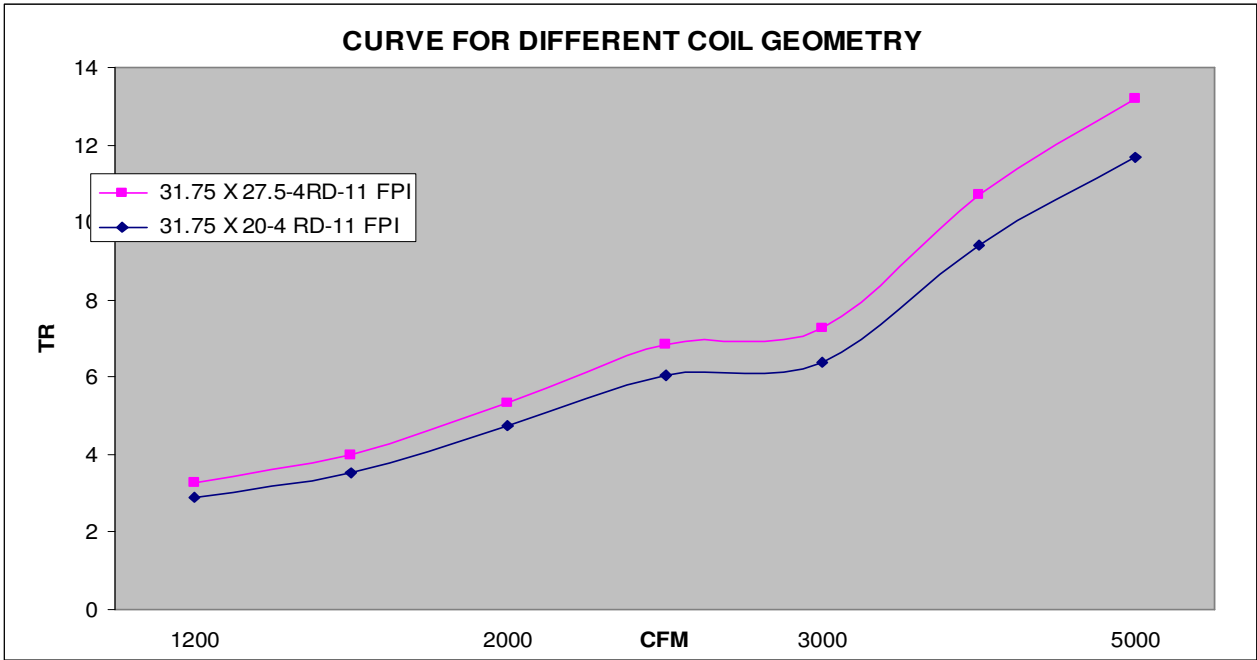
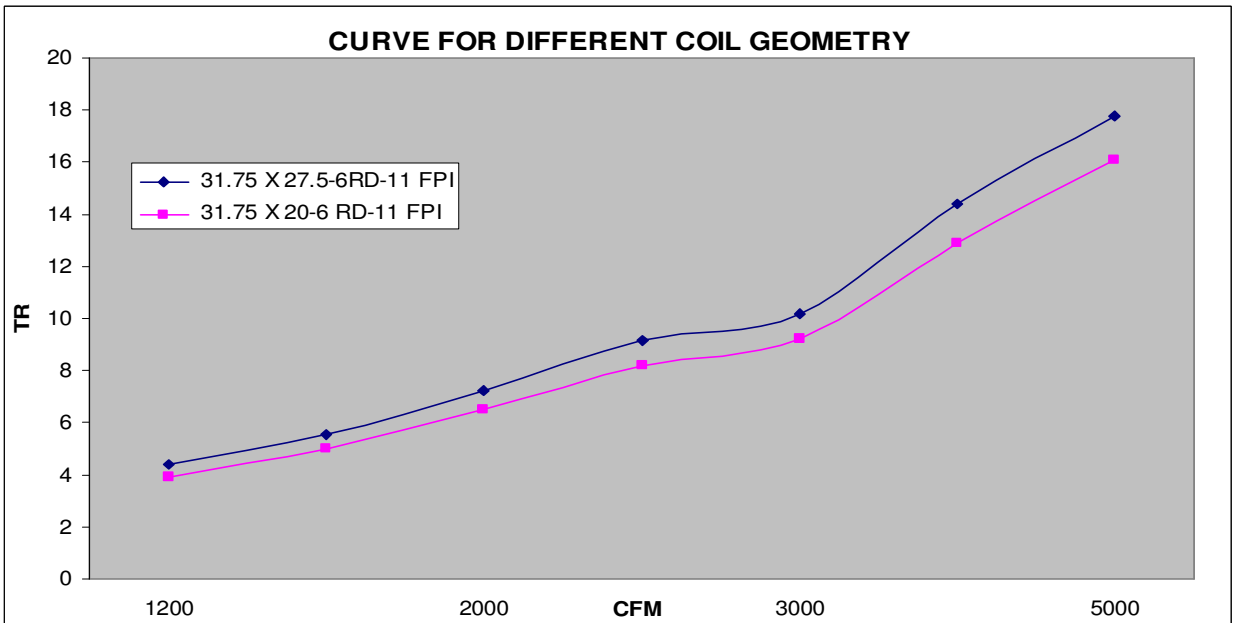


Table: 4 – Pitch is Changed (at 11 FPI & 0.41/0.15 & 6 Row)

S No	Air Quantity	Pitch		% Variance
		31.75 x 20.0	31.75 x 27.5	
	1200	3.93	4.38	10.27%
	1600	5.00	5.56	10.07%
	2000	6.49	7.23	10.23%
	2500	8.2	9.18	10.67%
	3000	9.21	10.2	9.70%
	4000	12.9	14.4	10.41%
	5000	16.1	17.8	9.55%



Now we would like to draw your attention to Table 5 & 6. In Table 5 you will see we have tried to compare a 4 Row coil with Equilateral pitch verses a 6 Row coil with Non standard pitch. You will notice there is an increase in capacity by 17 to 20%. However in Table 6 we have compared a 4 Row coil with Equilateral pitch verses a 6 Row coil with Equilateral pitch and the increase is even better 25 to 30%.

Table: 5 - Pitch & Row Changed

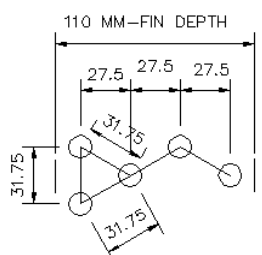
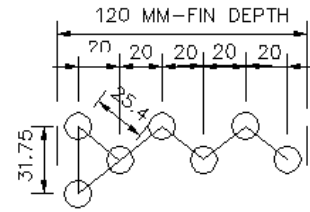
S No	Air Quantity	4 Row / 31.75 x 27.5 	6 Row / 31.75 x 20.0 		
	1200	3.26	3.93	17.04%	
	1600	4.00	5.00	20.00%	
	2000	5.36	6.49	17.41%	
	2500	6.84	8.2	16.58%	
	3000	7.27	9.21	21.06%	
	4000	10.7	12.9	17.05%	
	5000	13.2	16.1	18.01%	

Table: 6 – Rows Changed (at 11 FPI & 0.41/0.15 & 31.75 x 27.5 Pitch)

S No	Air Quantity	4 Row Deep	6 Row deep	% variance	
	1200	3.26	4.38	25.57%	
	1600	4.00	5.56	28.05%	
	2000	5.36	7.23	25.86%	
	2500	6.84	9.18	25.49%	
	3000	7.27	10.2	28.72%	
	4000	10.7	14.4	25.67%	
	5000	13.2	17.8	25.84%	

In view of the above comparisons, we leave the decision with you :-

1. Why should we not specify the pitch in the specification and let our customers get what they are already paying for.
2. If we want to provide our customer a better performing system by increasing a 4 Row to 6 Row, why not specify the pitch and have them get the right extra. (30% instead of 20%)