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Auxiliary Power Saving In Air Cooled Heat Exchanger by Fans

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ABSTRACT

A heat exchanger is a heat transfer device that exchanges heat between two or more process fluids. A heat exchanger is used for transfer of internal thermal energy between two or more fluids available at different temperatures. In most heat exchanger fluids are separated by a heat-transfer surface, and ideally they do not mix. Heat exchangers have widespread industrial and domestic applications. Today's heat exchangers must meet a variety of highly demanding requirements. In terms of performance, they have to ensure maximum heat transfer while keeping size to a minimum. Furthermore, the durability of heat exchangers must be extremely high, providing trouble-free performance throughout its service life at low manufacturing costs. The obvious advantage of an air cooler is that it does not require water, which means that equipment requiring cooling need not be near a supply of cooling water. In addition, the problems associated with treatment and disposal of water have become more costly with government regulations and environmental concerns. The air-cooled heat exchanger provides a means of transferring the heat from the fluid or gas into ambient air, without environmental concerns, or without great ongoing cost. This is made possible by the large variety of aluminum-based materials and product forms that empower system designers and manufacturers with multiple options for significant design improvement and cost reduction. Aluminum, in its various forms, offers clear possibilities to achieve these goals and is also well positioned to meet the challenges of the increasing market demands for cost effective, energy-efficient products and new customized, innovative applications.

INTRODUCTION

An air cooled heat exchanger, or ACHE, is simply a pressure vessel which cools a circulating fluid within finned tubes by forcing ambient air over the exterior of the tubes. The Air-cooled heat exchanger is a device for rejecting heat from a fluid or gas directly to ambient air. When cooling both fluids and gases, there are two sources readily available, with a relatively low cost, to transfer heat to…..air and water. A heat exchanger consists of heat-exchanging elements such as a core or matrix containing the heat-transfer surface, and fluid distribution elements such as headers or tanks, inlet and outlet nozzles or pipes, etc. Usually, there are no moving parts in the heat exchanger; however, there are exceptions, such as a rotary regenerator in which the matrix is driven to rotate at some design speed. The heat-transfer surface is in direct contact with fluids through which heat is transferred by conduction. The portion of the surface that separates the fluids is referred to as the primary or direct contact surface. To increase heat-transfer area, secondary surfaces known as fins may be attached to the primary surface

FANS

The air-cooled heat exchanger is controlled by two factors, the tube bundle size and configuration, and the ability to move air across the surface area that the bundle provides. Therefore, a major consideration of air cooler manufactures is not only the selection of the proper fan, but also the design of plenums to force the air across the surface area. The common means of moving air across the air cooler bundle is an axial flow, propeller type fan that either pushes (forced draft) the air across the bundle or pulls (induced draft) it across.

Even distribution of the air across the tube bundle is critical for uniform heat transfer. this is normally achieved by adequate fan to bundle coverage and controlling the static pressure loss across the bundle. A good design practice, and API661 requirement, is to maintain a forty percent (40%) coverage of the face area of the tube bundle to the area of the fan. Coverage's of less than this will allow for lower airflows on the outer surfaces of the tube bundle, and can result in poor performance. In addition, the distance from the fan to the coil can be critical. Again, good design practice requires an air dispersion angle of forty five percent (45%). The angle is measured from the outlet side of the fan ring to the center of the depth of the coil. This distance will allow the air to disperse, rather than channel directly through the bundle in front of the fan.

In horizontal configurations, the face coverage and air dispersion angle control the plenum size. On vertical configurations, many times the forty five percent dispersion angle is more difficult, since the overall size of the cooler is affected. Therefore, the designer must compensate for this design flaw by other means. This can be accomplished by additional air flow from the fan, resulting is more air flow than required directly in front of the fan, with the outside surfaces at the design velocity. It can also be accomplished by adding additional surface area to the coils affected. On vertical coolers with vertical air discharge, the designer also has to deal with the problem of discharging the air from the cooler, without causing additional pressure losses to the fan. Careful design of the size of the discharge plenum must be undertaken to assure the air can discharge the cooler.

Fans can vary in size from 2 to 20 feet in diameter, and can have from 2 to 16 blades. Common sizes are in one-foot increments, but can be supplied in any diameter desired. Generally the blades are aluminum, but other materials are available, including steel, fiberglass, reinforced plastic and wood. Normally the blades of the air cooler have a profile that allows an even distribution of air across the length of the blade. This can be accommodated for by a blade that has a wide chord width at the tip, and tapers to a narrow chord at the tip. In addition, most blades have a twist that compensates for the slower velocity at the portion of the blade closer to the center of the fan. This helps produce a more uniform, efficient air velocity pressure.

Heat Exchanger Fan Selection

Fan Engineering Nomenclature

ACFM - Actual cubic feet per minute of air moved by the fan.

Actual Conditions - Resistances related to actual inlet or outlet temperature and fan elevation above mean sea level compared to standard conditions.

Air Density - Air density at the plane of the fan based on standard or actual conditions.

Beam Passing Frequency - Number of times per revolution that one fan blade passes over a beam or strut thought of as "how the structure interacts with the fan blade" ex- pressed in cycles/sec (Hz).

Blade Natural Frequency - Frequency at which a blade freely vibrates when it is struck in cycles/sec (Hz).

Blade Passing Frequency - Number of times per revolution that a fan tip passes a point on the fan ring expressed in cycles/sec (Hz) thought of as "how the fan interacts with the structure".

Brake Horsepower - (BHP) **-** Net power required by the fan at actual conditions to perform the required design work.

Chord - Straight line distance between the leading and trailing airfoil edges.

Fan Diameter - Width/distance between opposite blade tips.

Fan Laws - Set of laws that predict performance changes if one or more parameters are changed from one fan or operating condition to another. These laws govern airflow, pres- sure capability and power required among many other parameters.

Fan Ring Diameter - Inside diameter of fan housing at the plane of fan.

First Mode Resonant Frequency - Frequency at which a blade freely vibrates when struck ("natural" frequency) in cycles/sec (Hertz).

Forced Draft ACHE - Fan is located below the heat transfer surface forcing ambient air through the bundle.

Harmonic Frequency - Integer multiples of fan RPM and expressed as 1x, 2x and 3x fan speed in cycles/second (Hertz). Harmonic frequency is checked against resonant frequencies to prevent vibration and fatigue.

Induced Draft ACHE - Fan is located above the heat transfer surface drawing ambient air through the bundle. The fan is exposed to the heated exhaust air.

Leading Edge - Thicker portion of the air-foil that is the first part of the blade to meet the air.

Net Free Area - Net area at the plane of the fan through which all air must pass.Usually based on the nominal fan diameter minus seal disc area or hub diameter. Note that blade area is not considered.
Pitch Angle - Blade tip angle below the horizontal required to do the design work and move air upward. Hudson fans all rotate clockwise looking into the airflow.
Static Efficiency - Fan efficiency based on static pressure and fan brake horsepower at the same density.
Static Pressure - Sum of all the system resistances against which the fan must work, expressed in inches of H_2O. This is the useful work required from the fan. (Velocity pressure excluded).
Tip Clearance - Distance between the tip blade and the fan ring or housing, sometimes expressed as a percent of the fandiameter.
Tip Speed - Peripheral speed of the fan tip expressed in feet per minute.
Total Efficiency - Fan efficiency based on the total pressure and fan brake horsepower at the same density for standard or actual conditions.
Fan Selection - Horsepower Requirements: The fan diameter must assure that the area occupied by the fan is at least 40 percent of the bundle face area. The fan diameter must be 6 inches less than the bundle width. Fan performance curves are used to select the optimum number of blades and pitch angle as well as the horsepower.
To calculate the required horsepower for the fan driver:

Motor Shaft Horsepower =Actual ft3/min (at fan) - Total Pressure Loss (inches water) 6356 - Fan (System) Efficiency - Speed Reducer Efficiency

The actual volume at the fan is calculated by multiplying the standard volume of air (by the density of standard air (0.075 lb/ft) divided by the density of air at the fan. From this relationship it can be seen that the ratio of the fan horsepower required for a forced draft unit to that required for an induced draft unit is approximately equal to the ratio of the exit air density to the inlet air density, which is in turn equal to the ratio of absolute air temperatures (t1 + 460) / t2 + 460). The total pressure difference across the fan is equal to the sum of the velocity pressure for the selected fan diameter, the static pressure loss through the bundle, and other losses in the aerodynamic system. Fan diameters are selected to give good air distribution and usually result in velocity pressures of approximately 0.1 inch of water. The design of the fan, the air plenum chamber, and the fan housing, (in particular fan tip clearance), can materially affect system efficiency, which is always lower than shown on fan curves based on idealized wind tunnel tests. Industrial axial flow fans in properly designed ACHEs have fan (system) efficiencies of approximately 75%, based on total pressure. Poorly designed ACHEs may have system efficiencies as low as 40%. Speed reducers usually have about 95% mechanical efficiency. The value of driver output horsepower from the equation above must be divided by the motor efficiency to determine input power.

Fan Blade Photograph by Cofimco fans

Fan Hub Photograph by Cofimco fans

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Auxilary Power Saving in Air Cooled Heat Exchanger Input Data for heat exchanger design-

	1	2	3	4	5
Flow (1000 kg/hr)	27.7810	27.7810	27.7810	144.87	91.212
Temp In(deg c)	122	111	107	82	70.84
Temp out(deg c)	52	57	57	75.45	54
Pressure In (kgf/cm2A)	21.79	39.37	70.88	4.602	4.602
Pressure drop (kg/cm2)	.714	.714	.714	.816	.612

Data is obtained from HTRI Software (From input data)

Series Summary
Released to the following HTRI Member Company:
Page 2

Xace Ver. 6.00 5/9/2012 12:15 SN: 1500214117 MKH Units
CCEG,
RFQ-001374/10-11 KPCL ,PUNE : Summary Unit
Rating-Horizontal air-cooled heat exchanger forced draft countercurrent to crossflow

Bundle Number			1		2		3		4		5
Outside film coef	kcal/m2-hr-C)		901.97		901.33		904.17		901.00		931.41
Tubeside film coef	kcal/m2-hr-C)		928.52		1562.08		1036.52		7317.47		5005.55
Clean coef	kcal/m2-hr-C)		17.07		21.78		18.10		31.96		31.00
Duty	(MM kcal/hr)		1.0627		0.9061		0.9009		0.9467		1.5309
Actual U	kcal/m2-hr-C)		17.07		21.78		18.10		31.96		31.00
Required U	kcal/m2-hr-C)		15.03		19.22		16.36		27.11		28.15
EMTD	(C)		20.8		16.9		16.9		13.7		7.9
Overdesign	(%)		13.60		13.32		10.64		17.88		10.10
Tubeside Process Conditions											
Fluid name			HC Gas		HC GAS		HC GAS		WATER		WATER
Fluid condition			Sens. Gas		Sens. Gas		Cond. Vapor		Sens. Liquid		Sens. Liquid
Total flow rate	(1000-kg/hr)		27.7810		27.7810		27.7810		144.870		91.2120
Weight fraction vapor, In/Out	(--)	1.000	1.000	1.000	1.000	1.000	0.999	0.000	0.000	0.000	0.000
Temperature, In/Out	(Deg C)	122.00	57.00	111.00	57.00	107.00	57.00	82.00	75.45	70.84	54.00
Skin temperature, Min/Max	(Deg C)	49.55	104.56	49.69	101.60	49.67	94.32	67.77	81.23	52.47	68.94
Pressure, Inlet/Outlet	(kgf/cm2A)	21.794	21.475	39.374	38.814	70.882	70.748	4.602	4.356	4.602	4.235
Pressure drop, Total/Allow	(kgf/cm2)	0.319	0.714	0.560	0.714	0.134	0.714	0.247	0.816	0.368	0.612
Midpoint velocity	(m/s)		16.22		10.63		4.83		1.48		1.02
- In/Out	(m/s)	18.47	15.15	11.91	9.95	5.46	4.52	1.48	1.48	1.03	1.02
Heat transfer safety factor	(--)		1		1		1		1		1
Fouling	m2-hr-C/kcal)		0.000000		0.000000		0.000000		0.000000		0.000000
Airside Velocities		**Actual**	**Standard**	**Actual**	**Standard**	**Actual**	**Standard**	**Actual**	**Standard**	**Actual**	**Standard**
Face	(m/s)	3.10	2.84	3.05	2.80	3.09	2.83	3.00	2.75	3.62	3.32
Maximum	(m/s)	6.18	5.67	6.43	5.90	6.44	5.91	6.37	5.84	6.75	6.19
Flow	(100 m3/min)	28.625	26.256	23.376	21.441	27.568	25.287	21.123	19.375	70.956	65.084
Airside Pressure Drop											
Bundle pressure drop	(mmH2O)		17.804		17.803		17.803		17.809		17.797
Steam coil pressure drop	(mmH2O)		0.00		0.00		0.00		0.00		0.00
Geometry											
Area Extended/Bare	(m2)	3391.45	144.340	2781.45	118.379	3254.90	138.529	2550.59	108.553	6920.31	294.529
Tubecount Odd/Even	(--)	14	14	12	11	14	13	11	10	29	28
Tube OD/ID	(mm)	25.400	20.580	25.400	20.580	25.400	20.580	25.400	20.580	25.400	20.580
Pitch Trans/Long	(mm)	63.500	54.991	63.500	54.991	63.500	54.991	63.500	54.991	68.000	58.888
Bundle width	(mm)		933.		775.		902.		711.		1980.
Tube type	(--)		High-finned		High-finned		High-finned		High-finned		High-finned
Tube length	(mm)		16500.		16500.		16500.		16500.		16500.
Area ratio(out/in)	(--)		28.9992		28.9992		28.9992		28.9992		28.9992
Layout	(--)		Staggered		Staggered		Staggered		Staggered		Staggered
Number of passes	(--)		1		1		1		1		3
Number of rows	(--)		8		8		8		8		8
Tubecount	(--)		112		92		108		84		228
Tube material			Carbon steel		Carbon steel		Carbon steel		Carbon steel		Carbon steel
Fin Geometry											
Type	(--)		Plain round		Plain round		Plain round		Plain round		Plain round
Fins/length	fin/meter		433.0		433.0		433.0		433.0		433.0
Fin root	mm		25.400		25.400		25.400		25.400		25.400
Height	mm		15.875		15.875		15.875		15.875		15.875
Base thickness	mm		0.400		0.400		0.400		0.400		0.400
Over fin	mm		57.150		57.150		57.150		57.150		57.150
Efficiency	(%)		76.8		76.9		76.9		77.2		76.4
Area ratio (fin/bare)	(--)		23.4962		23.4962		23.4962		23.4962		23.4962
Material			Aluminum 1060 - H14		Aluminum 1060 - H14		Aluminum 1060 - H14		Aluminum 1060 - H14		Aluminum 1060 - H14

Data is obtained from HTRI Software (From input data)

Output Summary Page 1
Released to the following HTRI Member Company:

Xace Ver. 6.00 5/9/2012 12:15 SN: 1500214117 MKH Units
CCEG,
RFQ-001374/10-11 KPCL ,PUNE : Summary Unit
Rating-Horizontal air-cooled heat exchanger forced draft countercurrent to crossflow

No Data Check Messages.
No Runtime Messages.

Overall Exchanger Performance

Minimum overdesign	(%)	10.1	Heat Duty	(MM kcal/hr)	5.3473
Maximum overdesign	(%)	17.9			

Outside Process Conditions			
Fluid name			
Fluid condition			Sens. Gas
Total flow rate	(1000-kg/hr)		1134.92
Weight fraction vapor, In/Out	(--)	1.000	1.000
Temperature, In/Out	(Deg C)	47.20	63.79
Skin temperature, Min/Max	(Deg C)	49.46	103.98
Pressure, Inlet/Outlet	(kgf/cm2A)	1.033	1.031
Pressure drop, Total/Allow	(mmH2O)	19.864	
Midpoint velocity	(m/s)		6.63
Heat transfer safety factor	(--)		1
Fouling	(m2-hr-C/kcal)		0.000000

Unit Geometry		
Bays in parallel per unit	(--)	1
Bundles parallel per bay	(--)	5
Total Extended area	(m2)	18898.7
Total bare area	(m2)	804.329

Fan Geometry		
No/bay	(--)	4
Fan ring type	(--)	Flanged
Diameter	(mm)	3505.
Ratio, Fan/bundle face area	(--)	0.44
Driver power	(kW)	24.72
Tip clearance	(mm)	17.525
Efficiency	(%)	65

Maximum Airside Velocities		Actual	Standard
Face	(m/s)	3.62	3.32
Maximum	(m/s)	6.75	6.19
Flow	(100 m3/min)	171.647	157.444
Velocity pressure	(mmH2O)	3.093	
Bundle pressure drop	(mmH2O)	17.809	

Airside Pressure Drop, (mmH2O)	
Ground clearance	0.00
Fan ring	1.54
Fan guard	0.00
Louvers	0.51
Fan area blockage	0.00
Hail screen	0.00

Exchanger Weights			
Weight/Bundle	(kg)	43066	
Structure weight	(kg)	11225	
Total weight, Dry / Wet	(kg)	60705 /	64687
Ladder/walkway weight	(kg)	6413	

Calculations –

Flow Rate,

$$Q = m \times Cp \times (T_i - T_o)$$

$$5.3473 \times 10^6 = m \times .2409\,(63.79 - 47.2)$$

(From output summary, Q =5.3473 metric million kcal /hr)
(1metric million $= 10^6$)

$$m = 1.338 \times 10^6 \text{ kg/hr}$$

HTRI Software summary report is based on experimental data & Air side correction factor (benefit factor varies from 10 to 20%)

m = 1338 1000-kg/hr
by dividing correction factor 1.179
m = 1338/1.179

m = 1134.86 1000-kg/hr

Number of fans calculation – As per **API 661,**fan coverage area to the bundle face area must be greater than 40 % fan coverage of area
From Summary report

L = 16.5m
B = 5.3m

So,

$$\frac{\pi}{4} X d^2 = L \times B$$

$$D = 16.68 = 17m$$

Hence ,number of fans=d/b= 3.21

Therefore , number of fans = 4

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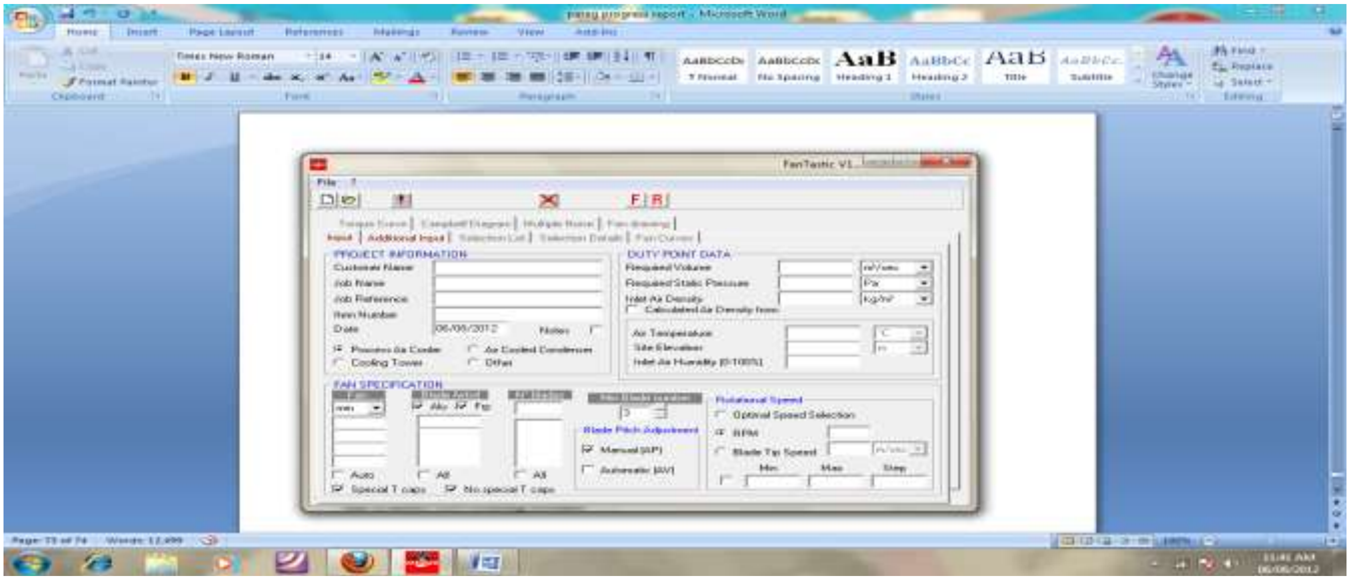
Cofimco Fan Selection Software



Screen shots original by Parag

By feeding the data into the software,
We obtained the following data,

COFIMCO

Via A. Gramsci, 62 - 28050 Pombia (NO) Italy - Phone +39-0321-968311 - Fax +39-0321-958992
9660 Grunwald Road - Beasley Texas 77417 - Phone +1-281-275 8390 - Fax +1-281-275 8388
Kai Xuan Hua Yuan, 111 Zhong Cao Road, Shanghai 200030, P.R.China - Phone +86-2164-686460 - Fax +86-2164-686460

Customer Name	KPCL	Job Reference	1374
Job Name	CCEG	Date	5/9/2012
Item Number	E01		

CHARACTERISTICS

Required Volume	283730.00 kg/h	Required Static Pressure	19.8640 mm H2O
Pressure recovery	0.0 mm H2O	Fan static pressure	19.86 mm H2O
Velocity pressure	2.99 mm H2O	Total pressure	22.86 mm H2O
Air Temperature	47.2 °C	Site Elevation	10.0 m
Inlet Air Humidity (%)		Inlet Air Density	1.101 kg/m³
Fan diameter	3505 mm	Fan ring diameter	3533 mm
Blade Airfoil	34N ALU	Rotor hub type	B3
Speed	224.0 RPM	Blade Tip Speed	41.10 m/sec
N° blades	7	Blade frequency +/-5%	289 cpm
Static efficiency	65.6 %	Total efficiency	75.5 %
Blade pitch angle	12.5 (°)	Rotor shaft power	21.3 kW
Min. Ambient Temperature	16.0 °C	Rotor shaft power @ 16.0 °C	23.6 kW
Pressure Margin (%)	21 [1] / 44 [2]	Volume Margin (%)	10 [1]
Tip Clearance/D	0.004	Inlet	Flanged
Diffuser angle (°)		Diffuser:Length/D	
Inlet Obstacle a/A		Inlet Obstacle x/D	
Outlet Obstacle a/A		Outlet Obstacle x/D	
Installation Type	Forced	Aerod axial force	2163 N
Rotor total weight	128 kg		
Rotor inertia PD²	365 kg x m²		
Max residual unbalance	18.9 N		
Blade Failure Load	4643 N		
2 Blades Failure Load	8366 N	Xr Running deflection	102 mm
Xs Static deflection	138 mm		

[1] at API Point [2] at Design Pitch Angle

Tolerance on sound values +/- 2 dB(A)

NOISE CHARACTERISTICS

PWL (± 2)	SPL @ 1.0 m From Fan	Inlet / outlet (± 2)	Side (± 2)
92.3 dB(A)		79.4 dB(A)	69.6 dB(A)

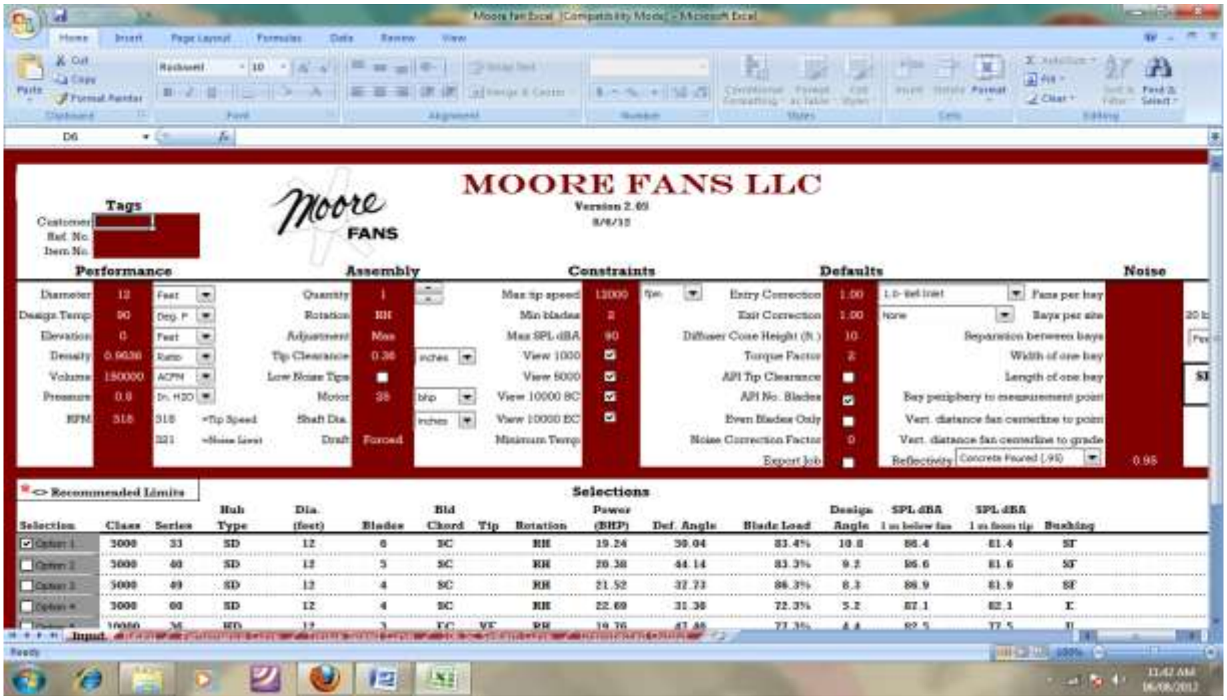
Octave [Hz]	31.5	63	125	250	500	1000	2000	4000	8000
PWL [dB]	95.3	97.3	97.3	93.3	90.3	87.3	79.3	75.3	71.3
Inlet/Outlet SPL [dB]	82.4	84.4	84.4	80.4	77.4	74.4	66.4	62.4	58.4
Side SPL [dB]	72.6	74.6	74.6	70.6	67.6	64.6	56.6	52.6	48.6
Tolerance +/-	5.0	5.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0

ROTOR MODEL 3505- 7-34N/B3T PAC

Fantastic.NET 2008.2

All data must be approved by Cofimco

Moore fan selection software



Screen shots original by Parag

By feeding the data into the software, We obtained the following data,

Moore Fans LLC Rating

Phone: (660) 376-3575 | http://www.moorefans.com | Fax:(660) 376-2909

Version 2.14
6/9/2012 11:41

KPCL		Ref No.:	0001374/10-11	Item No:	CCEG
Class:	10000	Hub Type:	HD	Blade Type:	SC
Blade Tip:	VT	Adjustment:	MAN	Rotation:	RH
Series:	60	Diameter:	3505 mm	Blades:	11
Temperature:	47.2 Deg. C	Elevation:	10 meters	Density Ratio:	0.917
Volume:	283730 kg/hr	Air Vel.:	8.78 m/s	Speed:	224 RPM
Static Pressure:	19.864 mm wg	Pv:	4.331 mm wg	Pt:	28.310 mm wg
Power Reqd.:	25.72 kW	Motor:	30 kW	Total Eff:	77.0%
Power @ 16 deg.	28.49 kW	Bld Natural Freq.:	9.5 Hz	Static Eff:	60.0%
Blades Required:	9.96	API Blades Req.:	11	Blade Load:	0.906
Tip Speed:	41.1 m/s	Deflection Angle:	51.8 deg.	Pitch Number:	1.54
Entry Correction:	1.3	Tip Clearance:	0.68996 inches	Design Angle:	12.2 deg
Exit Correction:	1.50	Draft:	Forced	Orientation:	Vertical
Torque Factor:	2	Motor Torque:	261 kg m	Torq/Bld:	24 kg m
Appr fan weight:	320 lbs	145 kg		Bore Size:	inches
WR2	2202 lb-ft2	93.0 kg m2		Bushing Type:	U
Thrust Load:	542 lbs	246 kg		Qty required:	1

Noise Levels Per Fan (Forced Draft) (Vertical Orientation)

dBA	HZ	63	125	250	500	1000	2000	4000	8000
Sound Power Level									
95.8		101.8	100.8	97.8	92.8	90.8	84.8	78.8	72.8
Sound Pressure Level 1 meter from face of unit									
82.0		88.0	87.0	84.0	79.0	77.0	71.0	65.0	59.0
Sound Pressure Level 1 meter radially from blade tip									
77.0		83.0	82.0	79.0	74.0	72.0	66.0	60.0	54.0

Class 10000, Series 60, 3505 mm Diameter, 11 Blades
Manual Adjustment, Heavy Duty, Standard Chord, Right Hand Rotation
With VT Blade Tips,
Fan Model No. 1060/123-U0-A/60R-VT-3-11.50-11
Fan Drawing: http://moorefans.com/pdfs/TMC_819_B.pdf
Note: Maximum blade angle to prevent fan stall is 16.0 degrees.
Available motor power may limit maximum angle to a lower value.

Costing Of Fans

Cost of Moore Fan = USD 900/ per fan = 900 x 55 =Rs. 49500/-
Cost of Cofimco Fan = Euro 868/ Per Fan =868 x 69 = Rs. 59892/-

Total Number of fans = 4
Therefore, Cost of Moore Fan = 1,98,000
Cost of Cofimco Fan = 2,39,568

CONCLUSION & RESULT

Auxiliary Power saving in fans –

Power Consumption per fan –
Power Consumption in Cofimco fan = 23.6 kw
Power Consumption in Moore fan = 28.49 kw
And,
Cofimco fan consumes less power than Moore fan = 28.49- 23.6 = 4.89 kw
Therefore, Power Saving in Cofimco fan = 4.89 kw
Total Number of fans = 4

Therefore ,Total Power Saving = 19.56 kw

Both the Fan manufacturer use the Aluminum for fan blade, but power consumption is different due to the following reason:-

1. Cofimco fans blade are more flexible as compare to Moore blade Due to flexible blade cofimco fans are easy to absorb jerk during running condition as well as longer life as compare to Moore fans.
2. Weight of Cofimco Fans(128Kg) are less than Moore fans(145Kg).
3. There are 7 number of fan blades in Cofimco fan& Number of fan blades in Moore fan are 11.

Total Power Saving = 19.56 KW = 19560 W

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