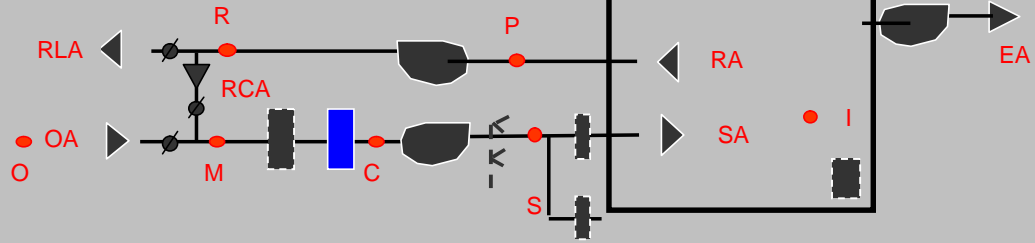


### SIZING OF COOLING COIL



System ID		1	2	3
SYSTEM AIR BALANCE, FT <sup>3</sup> /MIN	Supply air (SA)	14,717	0	0
	Outdoor air (OA)	2,431	0	0
	Exhaust air (EA)	1,188	850	0
	Return air RA=SA-EA	13,530	-850	0
	Recirculating air RCA=SA-OA	12,286	0	0
	Relief air RLA=OA-EA	1,243	-850	0
PSYCHROMETRICS	Plenum cooling load, Btu/h	45,671	0	0
	Space latent load, Btu/h	30,734	0	0
	Plenum temperature rise $\Delta T_p = \text{Plenum load} / (c \rho \text{ RA})$	3.1	0.0	0.0
	Supply fan temp rise $\Delta T_{SF}$	1.6	0.0	0.0
	Return fan temp rise $\Delta T_{RF}$	0.5	0.0	0.0
	$T_O$	87.0	87.0	87.0
	Outdoor air density $D_O$	0.0722	0.0722	0.0722
	$HR_O$	93.0	93.0	93.0
	$T_I$	75.0	75.0	75.0
	$HR_I$	64.0	64.0	64.0
	$T_p = T_I + \Delta T_p$	78.1	75.0	75.0
	$HR_p = HR_I$	64.0	64.0	64.0
	$T_R = T_p + \Delta T_{RF}$	78.6	75.0	75.0
	Return air density $D_R$	0.0735	0.0735	0.0735
	$HR_R = HR_p$	64.0	64.0	64.0
	$T_M = (T_R \times D_R \times RCA + T_O \times OA \times D_O) / (RCA \times D_R + OA \times D_O)$	80.0	75.0	75.0
	$HR_M = (HR_R \times D_R \times RCA + HR_O \times OA \times D_O) / (RCA \times D_R + OA \times D_O)$	68.7	64.0	64.0
	$T_S$	55.0	57.0	57.0
	$HR_S = HR_I - \text{Space latent load} / (r \rho \text{ SA})$	61.0	64.0	64.0
	$T_C = T_S - \Delta T_{SF}$	53.4	57.0	57.0
$HR_C = HR_S$	61.0	64.0	64.0	
$T_{ADP}$	52.0			
$HR_{ADP}$	52.0			
$BF = (T_C - T_{ADP}) / (T_M - T_{ADP})$	0.050	0.760	0.760	

Legend: r- heat of water vaporization, c -specific heat,  $\rho$ - density  
 Temperature - °F, Humidity ratio- grains/lb

## SIZING OF COOLING COIL

### COOLING COIL LOAD, BTU/H

System ID	1	2	3
Sensible Load = $c \rho SA (T_C - T_M)$	422,816	0	0
Latent Load = $SA r \rho (HR_C - HR_M)$	79,263	0	0
Total	502,079	0	0

### COOLING REQUIREMENTS BREAKDOWN, BTU/H

Space sensible cooling load	273,325	0	0
Space latent cooling load	30,734	0	0
Ventilation sensible load = $c \rho [(OA-EA) (T_O - T_R) + EA (T_O - T_I)]$	26,598	0	0
Ventilation latent load = $r \rho OA (HR_O - HR_R)$	49,259	0	0
Plenum cooling load	45,671	0	0
Heat gain from supply fan: $HP_{SF} \times 0.7457 \times 3412$	25,443	0	0
Heat gain from return fan: $HP_{RF} \times 0.7457 \times 3412$	7,633	0	0
Total cooling requirements	458,663	0	0

Excess of cooling coil capacity	9.5%	0.0%	0.0%
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### FRACTIONAL COOLING REQUIREMENTS

Space sensible load	60%	0%	0%
Space latent load	7%	0%	0%
Ventilation sensible load	6%	0%	0%
Ventilation latent load	11%	0%	0%
Plenum cooling load	10%	0%	0%
Heat gain from supply fan	6%	0%	0%
Heat gain from return fan	2%	0%	0%
Total	100%	0%	0%

### BENCHMARKS

Floor area $ft^2$ per ton of cooling	389	0	0
Airflow rate $ft^3/min$ per ton of cooling	385	0	0