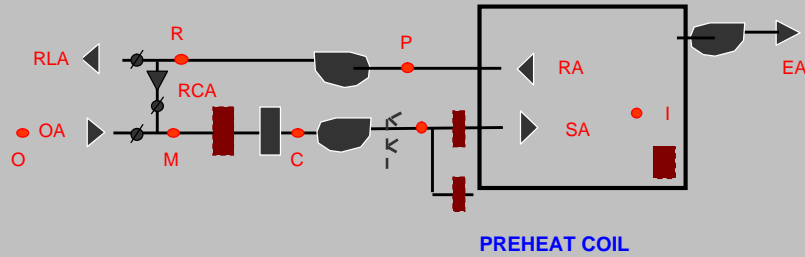


**SIZING OF PREHEAT COIL AND HUMIDIFIER**



System ID	1	2	3
Space heating load, Btu/h	299,240	54,741	0
Supply air (SA)	14,883	0	0
Outdoor air (OA)	2,431	0	0
Exhaust air (EA)	1,188	850	0
Return air RA=SA-EA	13,695	-850	0
Relief air RLA=OA-EA	1,243	-850	0
Recirculating air RCA=SA-OA	12,452	0	0
Plenum temperature rise	0.0	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
$T_O$	-2.9	-2.9	-2.9
Outdoor air density $D_O$	0.0863	0.0863	0.0863
$HR_O$	3.3	3.3	3.3
$T_I$	70.0	70.0	70.0
$HR_I$	32.0	32.0	32.0
$T_P = T_I$	70.0	70.0	70.0
$HR_P = HR_I$	32.0	32.0	32.0
$T_R = T_P + \Delta T_{RF}$	70.5	70.0	70.0
Return air density $D_R$	0.0749	0.0749	0.0749
$HR_R = HR_P$	32.0	32.0	32.0
$T_M = (T_R \times RCA \times D_R + T_O \times OA \times D_O) / (CAXD_R + OA \times D_O)$	57.0	70.0	70.0
$HR_M = (HR_R \times RCA \times D_R + HR_O \times OA \times D_O) / (CAXD_R + OA \times D_O)$	26.7	32.0	32.0
$T_S$	65.0	58.0	58.0
IF $T_M > T_S$ , coil is not required	Coil required	Coil not required	Coil not required
$T_S = T_I + Q \text{ loss}/c \rho SA$ or $T_S = T_W$	65.0	0.0	0.0
$HR_D = HR_I - \text{Latent load}/(r \rho SA)$	29.0	32.0	32.0
If $HR_D < HR_M$ , $HR_S = HR_M$ , otherwise $HR_S = HR_D$	Humidifier required	Humidifier not required	Humidifier not required
$T_C = T_S - \Delta T_{SF}$ , °F	63.4	0.0	0.0
$HR_C = HR_M$	26.7	32.0	32.0
$T_F = T_S$	65.0	0.0	0.0
$HR_F = HR_M$	26.7	32.0	32.0
Preheat coil load = $c \rho SA (T_C - T_M)$	102,554	0	0

Legend: r- heat of vaporization, c -specific heat capacity,  $\rho$ - density, rads- perimeter heating units  
 Temperature - °F, humidity ratio- grains/lb

**HUMIDIFER**

Minimum humidifier load = $SA \times \rho \times (HR_S - HR_F) / \text{lb/h}$	22	0	0
Maximum humidifier load = $OA \times \rho \times (HR_I - HR_O) / \text{lb/h}$	45	0	0