

# SPRAY DRYER - AIR FLOW TESTING

## INLET AIR

$t_{db} = 54.5^\circ F$   
 $t_{wb} = 43.40^\circ F$   
 $t_{gp} = 29.928^\circ F$   
 $RH = 39.0\%$   
 $W = 0.0035414 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 58,805.00$   
 $SCFM = 59,894.95$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 265,437.2862$   
 $\dot{m} (\frac{lb\ water}{hour}) = 940.0201$   
 $Q_{SEN} = 1,483,141.14 \frac{BTU}{hour}$   
 $Q_{LATENT} = 1,020,495.92 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 2,453,637.05 \frac{BTU}{hour}$

## NATURAL GAS CONSUMPTION

$\Delta Q_{HHV} = 21,043,303.36 \frac{BTU}{hour}$   
 $HHV (\frac{BTU}{lb}) = 23,426.18$   
 $HHV (\frac{BTU}{std\ ft^3}) = 1065.21$   
 $\dot{m} (\frac{std\ ft^3}{hour}) = 329.25$   
 $\dot{m} (\frac{std\ ft^3}{hour}) = 898.28$   
 $\dot{m} (\frac{std\ ft^3}{hour}) = 329.25$

## HOT AIR

$t_{db} = 345.20^\circ F$   
 $t_{wb} = 112.85^\circ F$   
 $t_{gp} = 59.267^\circ F$   
 $RH = 0.1976\%$   
 $W = 0.0109672 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 92,772.17$   
 $SCFM = 59,394.52$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 264,876.6861$   
 $\dot{m} (\frac{lb\ water}{hour}) = 2898.6729$

## EXHAUST AIR

$Q_{SEN} = 19,977,366.22 \frac{BTU}{hour}$   
 $Q_{LATENT} = 3,519,574.41 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 23,496,940.41 \frac{BTU}{hour}$

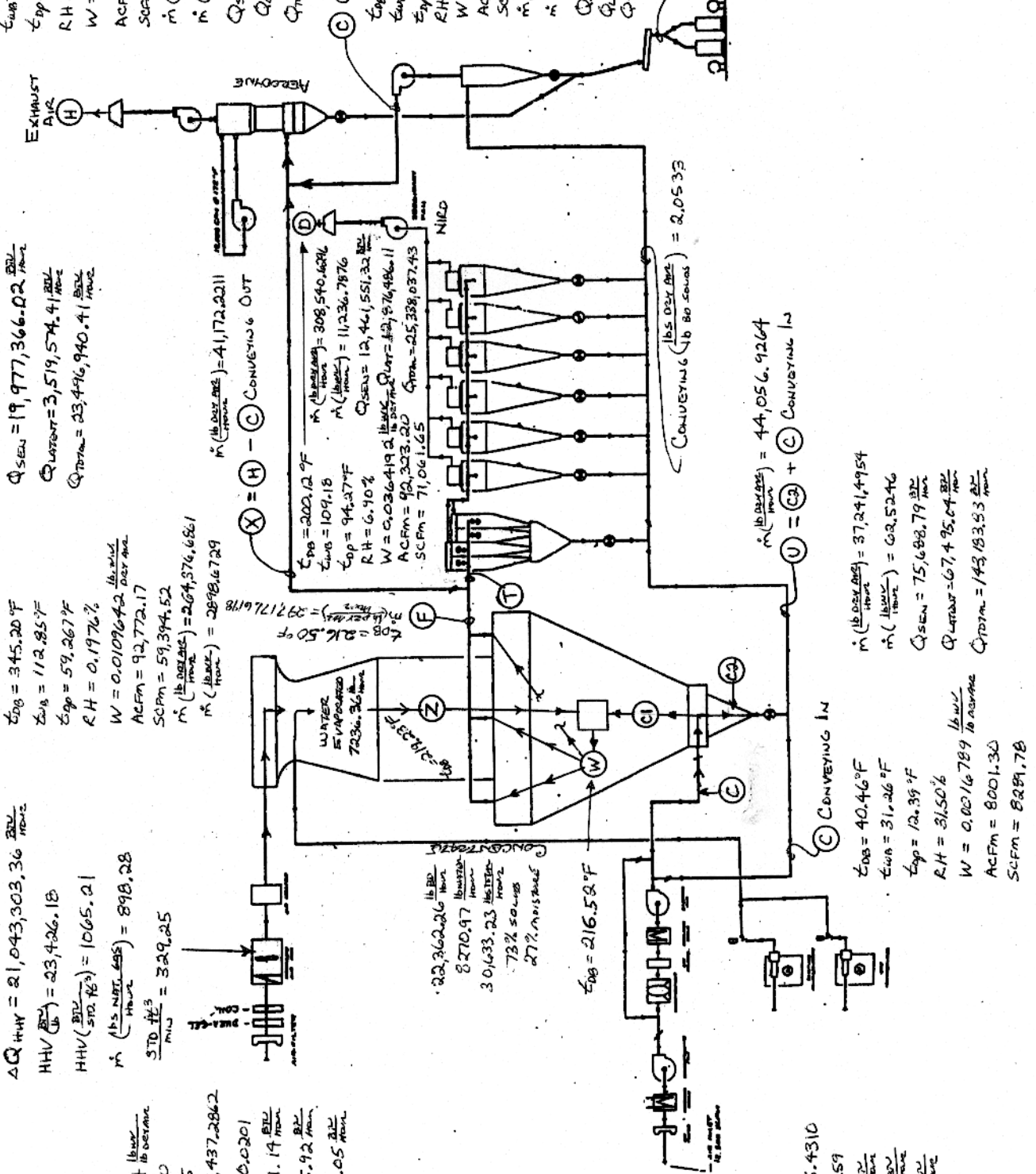
$t_{db} = 176.0^\circ F$   
 $t_{wb} = 98.83^\circ F$   
 $t_{gp} = 81.30^\circ F$   
 $RH = 7.70\%$   
 $W = 0.0236917 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 22,986.60$   
 $SCFM = 18,093.46$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 79,538,4077$   
 $\dot{m} (\frac{lb\ water}{hour}) = 1,884,3963$   
 $Q_{SEN} = 2,751,061.03 \frac{BTU}{hour}$   
 $Q_{LATENT} = 2,141,718.22 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 4,892,779.25 \frac{BTU}{hour}$

**CONVEYING OUT**  
 $t_{db} = 175.0^\circ F$   
 $t_{wb} = 67.87^\circ F$   
 $t_{gp} = 30.05^\circ F$   
 $RH = 5.20\%$   
 $W = 0.0035598 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 9541.37$   
 $SCFM = 8556.17$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 38,366.1966$   
 $\dot{m} (\frac{lb\ water}{hour}) = 136.5753$   
 $Q_{SEN} = 787,219.99 \frac{BTU}{hour}$   
 $Q_{LATENT} = 151,855.21 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 939,175.20 \frac{BTU}{hour}$

**CONVEYING IN**  
 $t_{db} = 200.12^\circ F$   
 $t_{wb} = 109.18^\circ F$   
 $t_{gp} = 94.27^\circ F$   
 $RH = 6.10\%$   
 $W = 0.0264192 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 92,303.20$   
 $SCFM = 71,061.65$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 308,540.628L$   
 $\dot{m} (\frac{lb\ water}{hour}) = 11,236.78\%$   
 $Q_{SEN} = 12,441,551.32 \frac{BTU}{hour}$   
 $Q_{LATENT} = 42,976,486.11 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 25,338,037.43 \frac{BTU}{hour}$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 297,172.6178$   
 $\dot{m} (\frac{lb\ water}{hour}) = 2,0533$

**CONVEYING IN**  
 $t_{db} = 40.46^\circ F$   
 $t_{wb} = 31.26^\circ F$   
 $t_{gp} = 12.39^\circ F$   
 $RH = 31.50\%$   
 $W = 0.0016789 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 8001.30$   
 $SCFM = 8289.78$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 37,241,4954$   
 $\dot{m} (\frac{lb\ water}{hour}) = 62,5246$   
 $Q_{SEN} = 75,688.79 \frac{BTU}{hour}$   
 $Q_{LATENT} = 67,495.04 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 143,183.83 \frac{BTU}{hour}$

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 $ACFM = 8001.30$   
 $SCFM = 8289.78$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 10,915.4310$   
 $\dot{m} (\frac{lb\ water}{hour}) = 18.3859$   
 $Q_{SEN} = 22,184.28 \frac{BTU}{hour}$   
 $Q_{LATENT} = 19,782.70 \frac{BTU}{hour}$   
 $Q_{TOTAL} = 41,966.98 \frac{BTU}{hour}$



$t_{db} = 216.52^\circ F$   
 $t_{wb} = 128.39^\circ F$   
 $t_{gp} = 51.50^\circ F$   
 $RH = 31.50\%$   
 $W = 0.0016789 \frac{lb\ water}{lb\ dry\ air}$   
 $ACFM = 23,445.17$   
 $SCFM = 24,297.2$   
 $\dot{m} (\frac{lb\ dry\ air}{hour}) = 10,915.4310$   
 $\dot{m} (\frac{lb\ water}{hour}) = 18.3859$   
 $Q_{SEN} = 22,184.28 \frac{BTU}{hour}$   
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