

TABLE 1. THERMODYNAMIC PROPERTIES OF MOIST AIR\* (STANDARD ATMOSPHERIC PRESSURE, 29.921 IN. HG) (Continued)

| FAHR.<br>TEMP.<br>t (F) | HUMIDITY<br>RATIO<br>W x 10 <sup>3</sup> | VOLUME<br>CU FT/LB DRY AIR |                 | ENTHALPY<br>BTU/LB DRY AIR |                 | ENTROPY<br>BTU PER (F) (LB DRY AIR) |                |                 | CONDENSED WATER |                                       | FAHR.<br>TEMP.<br>t (F) |
|-------------------------|------------------------------------------|----------------------------|-----------------|----------------------------|-----------------|-------------------------------------|----------------|-----------------|-----------------|---------------------------------------|-------------------------|
|                         |                                          | v <sub>g</sub>             | v <sub>as</sub> | h <sub>g</sub>             | h <sub>as</sub> | h <sub>a</sub>                      | s <sub>a</sub> | s <sub>as</sub> | h <sub>w</sub>  | Entropy<br>Btu/(Lb)<br>s <sub>w</sub> |                         |
|                         |                                          |                            |                 |                            |                 |                                     |                |                 |                 |                                       |                         |
| -95                     | 1.369                                    | 9.147                      | 0.000           | -23.075                    | 0.001           | -23.074                             | -0.05631       | 0.00000         | -199.73         | -0.4235                               | -95                     |
| -94                     | 1.486                                    | 9.173                      | 0.000           | -22.835                    | 0.002           | -22.833                             | -0.05565       | 0.00000         | -199.35         | -0.4225                               | -94                     |
| -93                     | 1.617                                    | 9.198                      | 0.000           | -22.594                    | 0.002           | -22.592                             | -0.05500       | 0.00000         | -198.97         | -0.4214                               | -93                     |
| -92                     | 1.756                                    | 9.224                      | 0.000           | -22.353                    | 0.002           | -22.351                             | -0.05434       | 0.00000         | -198.59         | -0.4204                               | -92                     |
| -91                     | 1.908                                    | 9.249                      | 0.000           | -22.113                    | 0.002           | -22.111                             | -0.05369       | 0.00001         | -198.21         | -0.4193                               | -91                     |
| -90                     | 2.068                                    | 9.275                      | 0.000           | -21.871                    | 0.002           | -21.870                             | -0.05303       | 0.00001         | -197.83         | -0.4183                               | -90                     |
| -89                     | 2.242                                    | 9.300                      | 0.000           | -21.631                    | 0.002           | -21.629                             | -0.05237       | 0.00001         | -197.44         | -0.4173                               | -89                     |
| -88                     | 2.430                                    | 9.325                      | 0.000           | -21.391                    | 0.003           | -21.388                             | -0.05172       | 0.00001         | -197.06         | -0.4162                               | -88                     |
| -87                     | 2.634                                    | 9.351                      | 0.000           | -21.150                    | 0.003           | -21.147                             | -0.05107       | 0.00001         | -196.67         | -0.4152                               | -87                     |
| -86                     | 2.852                                    | 9.376                      | 0.000           | -20.909                    | 0.003           | -20.906                             | -0.05042       | 0.00001         | -196.29         | -0.4142                               | -86                     |
| -85                     | 3.089                                    | 9.401                      | 0.000           | -20.669                    | 0.003           | -20.666                             | -0.04978       | 0.00001         | -195.90         | -0.4131                               | -85                     |
| -84                     | 3.342                                    | 9.426                      | 0.000           | -20.428                    | 0.003           | -20.425                             | -0.04912       | 0.00001         | -195.51         | -0.4121                               | -84                     |
| -83                     | 3.615                                    | 9.451                      | 0.000           | -20.188                    | 0.004           | -20.184                             | -0.04849       | 0.00001         | -195.12         | -0.4110                               | -83                     |
| -82                     | 3.909                                    | 9.477                      | 0.000           | -19.947                    | 0.004           | -19.943                             | -0.04785       | 0.00001         | -194.73         | -0.4100                               | -82                     |
| -81                     | 4.225                                    | 9.502                      | 0.000           | -19.706                    | 0.004           | -19.702                             | -0.04721       | 0.00001         | -194.34         | -0.4090                               | -81                     |
| -80                     | 4.564                                    | 9.527                      | 0.000           | -19.466                    | 0.005           | -19.461                             | -0.04658       | 0.00001         | -193.95         | -0.4079                               | -80                     |
| -79                     | 4.930                                    | 9.553                      | 0.000           | -19.225                    | 0.005           | -19.220                             | -0.04595       | 0.00001         | -193.55         | -0.4069                               | -79                     |
| -78                     | 5.322                                    | 9.578                      | 0.000           | -18.984                    | 0.005           | -18.979                             | -0.04532       | 0.00002         | -193.16         | -0.4059                               | -78                     |
| -77                     | 5.743                                    | 9.604                      | 0.000           | -18.743                    | 0.006           | -18.738                             | -0.04469       | 0.00002         | -192.76         | -0.4048                               | -77                     |
| -76                     | 6.193                                    | 9.629                      | 0.000           | -18.503                    | 0.006           | -18.497                             | -0.04406       | 0.00002         | -192.37         | -0.4038                               | -76                     |
| -75                     | 6.677                                    | 9.654                      | 0.000           | -18.263                    | 0.007           | -18.256                             | -0.04343       | 0.00002         | -191.97         | -0.4027                               | -75                     |
| -74                     | 7.196                                    | 9.680                      | 0.000           | -18.022                    | 0.007           | -18.015                             | -0.04280       | 0.00002         | -191.57         | -0.4017                               | -74                     |
| -73                     | 7.753                                    | 9.705                      | 0.000           | -17.782                    | 0.008           | -17.774                             | -0.04215       | 0.00003         | -191.17         | -0.4007                               | -73                     |
| -72                     | 8.349                                    | 9.730                      | 0.000           | -17.541                    | 0.008           | -17.533                             | -0.04155       | 0.00003         | -190.77         | -0.3996                               | -72                     |
| -71                     | 8.990                                    | 9.756                      | 0.000           | -17.301                    | 0.009           | -17.292                             | -0.04093       | 0.00003         | -190.37         | -0.3986                               | -71                     |
| -70                     | 9.675                                    | 9.781                      | 0.000           | -17.060                    | 0.010           | -17.050                             | -0.04033       | 0.00003         | -189.97         | -0.3975                               | -70                     |
| -69                     | 10.400                                   | 9.806                      | 0.000           | -16.820                    | 0.011           | -16.809                             | -0.03969       | 0.00003         | -189.56         | -0.3965                               | -69                     |
| -68                     | 11.19                                    | 9.831                      | 0.000           | -16.579                    | 0.011           | -16.568                             | -0.03908       | 0.00004         | -189.15         | -0.3954                               | -68                     |
| -67                     | 12.03                                    | 9.856                      | 0.000           | -16.339                    | 0.012           | -16.327                             | -0.03846       | 0.00004         | -188.75         | -0.3944                               | -67                     |
| -66                     | 12.93                                    | 9.882                      | 0.000           | -16.098                    | 0.013           | -16.085                             | -0.03785       | 0.00004         | -188.35         | -0.3934                               | -66                     |
| -65                     | 13.82                                    | 9.907                      | 0.000           | -15.857                    | 0.014           | -15.844                             | -0.03724       | 0.00004         | -187.94         | -0.3924                               | -65                     |
| -64                     | 14.81                                    | 9.932                      | 0.000           | -15.617                    | 0.015           | -15.602                             | -0.03663       | 0.00005         | -187.53         | -0.3913                               | -64                     |

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| FAHR.<br>TEMP.<br>t (F) | HUMIDITY<br>RATIO<br>W x 10 <sup>3</sup> | VOLUME<br>CU FT/LB DRY AIR |                 | ENTHALPY<br>BTU/LB DRY AIR |                 |                |                | ENTROPY<br>BTU PER (F) (LB DRY AIR) |                |                                      | CONDENSED WATER                       |                                                |     | FAHR.<br>TEMP.<br>t (F) |
|-------------------------|------------------------------------------|----------------------------|-----------------|----------------------------|-----------------|----------------|----------------|-------------------------------------|----------------|--------------------------------------|---------------------------------------|------------------------------------------------|-----|-------------------------|
|                         |                                          | v <sub>g</sub>             | v <sub>as</sub> | h <sub>g</sub>             | h <sub>as</sub> | h <sub>a</sub> | s <sub>a</sub> | s <sub>as</sub>                     | s <sub>g</sub> | Enthalpy<br>Btu/Lb<br>h <sub>w</sub> | Entropy<br>Btu/(Lb)<br>s <sub>w</sub> | Vap. Press<br>p <sub>w</sub> x 10 <sup>3</sup> |     |                         |
|                         |                                          |                            |                 |                            |                 |                |                |                                     |                |                                      |                                       |                                                |     |                         |
| -64                     | 1.601                                    | 9.958                      | 0.000           | -15.377                    | 0.016           | -15.361        | -0.03602       | 0.00005                             | -0.03597       | -187.12                              | -0.3903                               | 0.7654                                         | -64 |                         |
| -63                     | 1.718                                    | 9.983                      | 0.000           | -15.137                    | 0.018           | -15.119        | -0.03541       | 0.00005                             | -0.03536       | -186.71                              | -0.3893                               | 0.8213                                         | -63 |                         |
| -62                     | 1.843                                    | 10.009                     | 0.000           | -14.896                    | 0.019           | -14.877        | -0.03481       | 0.00006                             | -0.03475       | -186.30                              | -0.3882                               | 0.8810                                         | -62 |                         |
| -61                     | 1.976                                    | 10.034                     | 0.000           | -14.656                    | 0.020           | -14.636        | -0.03420       | 0.00006                             | -0.03414       | -185.89                              | -0.3872                               | 0.9447                                         | -61 |                         |
| -60                     | 2.118                                    | 10.059                     | 0.000           | -14.416                    | 0.022           | -14.394        | -0.03360       | 0.00006                             | -0.03354       | -185.47                              | -0.3861                               | 1.0127                                         | -60 |                         |
| -59                     | 2.269                                    | 10.085                     | 0.000           | -14.175                    | 0.023           | -14.152        | -0.03300       | 0.00007                             | -0.03293       | -185.06                              | -0.3851                               | 1.0852                                         | -59 |                         |
| -58                     | 2.431                                    | 10.110                     | 0.000           | -13.935                    | 0.025           | -13.912        | -0.03240       | 0.00007                             | -0.03233       | -184.64                              | -0.3841                               | 1.1624                                         | -58 |                         |
| -57                     | 2.603                                    | 10.135                     | 0.000           | -13.695                    | 0.027           | -13.668        | -0.03180       | 0.00008                             | -0.03172       | -184.23                              | -0.3830                               | 1.2447                                         | -57 |                         |
| -56                     | 2.786                                    | 10.161                     | 0.000           | -13.454                    | 0.029           | -13.425        | -0.03120       | 0.00008                             | -0.03112       | -183.81                              | -0.3820                               | 1.3294                                         | -56 |                         |
| -55                     | 2.982                                    | 10.186                     | 0.000           | -13.214                    | 0.031           | -13.183        | -0.03060       | 0.00009                             | -0.03052       | -183.39                              | -0.3810                               | 1.4258                                         | -55 |                         |
| -54                     | 3.190                                    | 10.211                     | 0.000           | -12.974                    | 0.033           | -12.941        | -0.03000       | 0.00009                             | -0.02993       | -182.97                              | -0.3799                               | 1.5253                                         | -54 |                         |
| -53                     | 3.411                                    | 10.237                     | 0.000           | -12.733                    | 0.035           | -12.698        | -0.02943       | 0.00010                             | -0.02933       | -182.55                              | -0.3789                               | 1.6312                                         | -53 |                         |
| -52                     | 3.646                                    | 10.262                     | 0.001           | -12.493                    | 0.038           | -12.455        | -0.02884       | 0.00011                             | -0.02873       | -182.13                              | -0.3779                               | 1.7438                                         | -52 |                         |
| -51                     | 3.897                                    | 10.288                     | 0.001           | -12.253                    | 0.041           | -12.212        | -0.02825       | 0.00011                             | -0.02814       | -181.71                              | -0.3769                               | 1.8610                                         | -51 |                         |
| -50                     | 4.163                                    | 10.313                     | 0.001           | -12.012                    | 0.043           | -11.969        | -0.02766       | 0.00012                             | -0.02754       | -181.29                              | -0.3758                               | 1.9814                                         | -50 |                         |
| -49                     | 4.446                                    | 10.338                     | 0.001           | -11.772                    | 0.046           | -11.726        | -0.02707       | 0.00012                             | -0.02696       | -180.87                              | -0.3748                               | 2.1264                                         | -49 |                         |
| -48                     | 4.747                                    | 10.364                     | 0.001           | -11.532                    | 0.049           | -11.483        | -0.02649       | 0.00013                             | -0.02636       | -180.44                              | -0.3738                               | 2.2702                                         | -48 |                         |
| -47                     | 5.066                                    | 10.389                     | 0.001           | -11.292                    | 0.053           | -11.239        | -0.02590       | 0.00014                             | -0.02577       | -180.02                              | -0.3728                               | 2.4230                                         | -47 |                         |
| -46                     | 5.406                                    | 10.414                     | 0.001           | -11.051                    | 0.056           | -11.000        | -0.02532       | 0.00014                             | -0.02518       | -179.59                              | -0.3717                               | 2.5854                                         | -46 |                         |
| -45                     | 5.766                                    | 10.440                     | 0.001           | -10.811                    | 0.060           | -10.751        | -0.02474       | 0.00015                             | -0.02459       | -179.16                              | -0.3707                               | 2.7578                                         | -45 |                         |
| -44                     | 6.149                                    | 10.465                     | 0.001           | -10.571                    | 0.064           | -10.507        | -0.02416       | 0.00016                             | -0.02400       | -178.73                              | -0.3696                               | 2.9408                                         | -44 |                         |
| -43                     | 6.555                                    | 10.490                     | 0.001           | -10.330                    | 0.068           | -10.262        | -0.02358       | 0.00017                             | -0.02341       | -178.30                              | -0.3686                               | 3.1349                                         | -43 |                         |
| -42                     | 6.985                                    | 10.516                     | 0.001           | -10.090                    | 0.073           | -10.017        | -0.02301       | 0.00019                             | -0.02282       | -177.87                              | -0.3676                               | 3.3408                                         | -42 |                         |
| -41                     | 7.441                                    | 10.541                     | 0.001           | -9.850                     | 0.078           | -9.772         | -0.02243       | 0.00020                             | -0.02223       | -177.44                              | -0.3665                               | 3.5591                                         | -41 |                         |
| -40                     | 7.925                                    | 10.566                     | 0.001           | -9.609                     | 0.083           | -9.526         | -0.02186       | 0.00021                             | -0.02165       | -177.01                              | -0.3655                               | 3.7908                                         | -40 |                         |
| -39                     | 8.437                                    | 10.592                     | 0.001           | -9.368                     | 0.089           | -9.280         | -0.02128       | 0.00022                             | -0.02107       | -176.58                              | -0.3645                               | 4.0359                                         | -39 |                         |
| -38                     | 8.980                                    | 10.617                     | 0.002           | -9.129                     | 0.094           | -9.035         | -0.02070       | 0.00024                             | -0.02048       | -176.14                              | -0.3634                               | 4.2958                                         | -38 |                         |
| -37                     | 9.556                                    | 10.642                     | 0.002           | -8.889                     | 0.100           | -8.789         | -0.02015       | 0.00025                             | -0.01990       | -175.71                              | -0.3624                               | 4.5711                                         | -37 |                         |
| -36                     | 10.16                                    | 10.668                     | 0.002           | -8.648                     | 0.106           | -8.542         | -0.01958       | 0.00026                             | -0.01932       | -175.27                              | -0.3614                               | 4.8696                                         | -36 |                         |
| -35                     | 10.81                                    | 10.693                     | 0.002           | -8.408                     | 0.113           | -8.295         | -0.01902       | 0.00028                             | -0.01874       | -174.84                              | -0.3604                               | 5.1713                                         | -35 |                         |
| -34                     | 11.49                                    | 10.718                     | 0.002           | -8.167                     | 0.121           | -8.047         | -0.01845       | 0.00030                             | -0.01815       | -174.40                              | -0.3593                               | 5.4870                                         | -34 |                         |
| -33                     | 12.21                                    | 10.744                     | 0.002           | -7.927                     | 0.128           | -7.799         | -0.01789       | 0.00032                             | -0.01757       | -173.96                              | -0.3583                               | 5.8437                                         | -33 |                         |

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