

TABLE 2. THERMODYNAMIC PROPERTIES OF WATER AT SATURATION<sup>a</sup> (Continued)

| FAHR.<br>TEMP.<br>(°F) | ABSOLUTE PRESSURE<br>$p_s \times 10^3$ |        | SPECIFIC VOLUME, CU. FT PER LB |                                  |                                    | ENTHALPY, BTU PER LB |                   |                     | ENTROPY, BTU PER (LB) (°F) |                   |                     | FAHR.<br>TEMP.<br>(°F) |
|------------------------|----------------------------------------|--------|--------------------------------|----------------------------------|------------------------------------|----------------------|-------------------|---------------------|----------------------------|-------------------|---------------------|------------------------|
|                        | Lb/Sq In.                              | In. Hg | Sat. Solid<br>$v_f$            | Evap.<br>$v_{fg} \times 10^{-4}$ | Sat. Vapor<br>$v_g \times 10^{-4}$ | Sat. Solid<br>$h_f$  | Evap.<br>$h_{fg}$ | Sat. Vapor<br>$h_g$ | Sat. Solid<br>$s_f$        | Evap.<br>$s_{fg}$ | Sat. Vapor<br>$s_g$ |                        |
| -32                    | 0.3049                                 | 0.6208 | 0.01738                        | 8.355                            | 8.355                              | -173.57              | 1220.52           | 1048.95             | -0.3573                    | 2.8538            | 2.4965              | -32                    |
| -31                    | 0.3239                                 | 0.6595 | 0.01738                        | 7.883                            | 7.883                              | -173.13              | 1220.53           | 1047.40             | -0.3562                    | 2.8470            | 2.4908              | -31                    |
| -30                    | 0.3440                                 | 0.7003 | 0.01738                        | 7.441                            | 7.441                              | -172.68              | 1220.52           | 1047.84             | -0.3552                    | 2.8405            | 2.4853              | -30                    |
| -29                    | 0.3652                                 | 0.7435 | 0.01738                        | 7.025                            | 7.025                              | -172.24              | 1220.52           | 1048.28             | -0.3542                    | 2.8339            | 2.4797              | -29                    |
| -28                    | 0.3876                                 | 0.7891 | 0.01738                        | 6.634                            | 6.634                              | -171.80              | 1220.52           | 1048.72             | -0.3532                    | 2.8274            | 2.4742              | -28                    |
| -27                    | 0.4113                                 | 0.8373 | 0.01738                        | 6.267                            | 6.267                              | -171.35              | 1220.51           | 1049.16             | -0.3521                    | 2.8207            | 2.4686              | -27                    |
| -26                    | 0.4363                                 | 0.8882 | 0.01738                        | 5.921                            | 5.921                              | -170.91              | 1220.51           | 1049.60             | -0.3511                    | 2.8143            | 2.4632              | -26                    |
| -25                    | 0.4627                                 | 0.9420 | 0.01739                        | 5.596                            | 5.596                              | -170.46              | 1220.51           | 1050.05             | -0.3501                    | 2.8078            | 2.4577              | -25                    |
| -24                    | 0.4905                                 | 0.9987 | 0.01739                        | 5.290                            | 5.290                              | -170.01              | 1220.50           | 1050.49             | -0.3490                    | 2.8013            | 2.4523              | -24                    |
| -23                    | 0.5199                                 | 1.059  | 0.01739                        | 5.003                            | 5.003                              | -169.56              | 1220.49           | 1050.93             | -0.3480                    | 2.7949            | 2.4469              | -23                    |
| -22                    | 0.5509                                 | 1.122  | 0.01739                        | 4.732                            | 4.732                              | -169.12              | 1220.49           | 1051.37             | -0.3470                    | 2.7885            | 2.4415              | -22                    |
| -21                    | 0.5836                                 | 1.188  | 0.01739                        | 4.477                            | 4.477                              | -168.66              | 1220.48           | 1051.82             | -0.3460                    | 2.7822            | 2.4362              | -21                    |
| -20                    | 0.6181                                 | 1.259  | 0.01739                        | 4.237                            | 4.237                              | -168.21              | 1220.47           | 1052.26             | -0.3449                    | 2.7757            | 2.4308              | -20                    |
| -19                    | 0.6545                                 | 1.333  | 0.01739                        | 4.011                            | 4.011                              | -167.76              | 1220.46           | 1052.70             | -0.3439                    | 2.7695            | 2.4256              | -19                    |
| -18                    | 0.6923                                 | 1.410  | 0.01740                        | 3.797                            | 3.797                              | -167.31              | 1220.45           | 1053.14             | -0.3429                    | 2.7632            | 2.4203              | -18                    |
| -17                    | 0.7322                                 | 1.493  | 0.01740                        | 3.596                            | 3.596                              | -166.85              | 1220.43           | 1053.58             | -0.3418                    | 2.7568            | 2.4150              | -17                    |
| -16                    | 0.7757                                 | 1.579  | 0.01740                        | 3.407                            | 3.407                              | -166.40              | 1220.42           | 1054.02             | -0.3408                    | 2.7506            | 2.4098              | -16                    |
| -15                    | 0.8204                                 | 1.670  | 0.01740                        | 3.228                            | 3.228                              | -165.94              | 1220.41           | 1054.47             | -0.3398                    | 2.7444            | 2.4046              | -15                    |
| -14                    | 0.8676                                 | 1.766  | 0.01740                        | 3.060                            | 3.060                              | -165.48              | 1220.39           | 1054.91             | -0.3388                    | 2.7383            | 2.3995              | -14                    |
| -13                    | 0.9172                                 | 1.867  | 0.01740                        | 2.901                            | 2.901                              | -165.03              | 1220.38           | 1055.35             | -0.3377                    | 2.7320            | 2.3943              | -13                    |
| -12                    | 0.9694                                 | 1.974  | 0.01740                        | 2.750                            | 2.750                              | -164.57              | 1220.36           | 1055.79             | -0.3367                    | 2.7259            | 2.3892              | -12                    |
| -11                    | 1.024                                  | 2.086  | 0.01740                        | 2.609                            | 2.609                              | -164.11              | 1220.34           | 1056.23             | -0.3357                    | 2.7198            | 2.3841              | -11                    |
| -10                    | 1.082                                  | 2.203  | 0.01741                        | 2.475                            | 2.475                              | -163.65              | 1220.32           | 1056.67             | -0.3347                    | 2.7138            | 2.3791              | -10                    |
| -9                     | 1.143                                  | 2.327  | 0.01741                        | 2.349                            | 2.349                              | -163.18              | 1220.30           | 1057.12             | -0.3336                    | 2.7076            | 2.3740              | -9                     |
| -8                     | 1.207                                  | 2.457  | 0.01741                        | 2.229                            | 2.229                              | -162.72              | 1220.28           | 1057.56             | -0.3326                    | 2.7016            | 2.3690              | -8                     |
| -7                     | 1.274                                  | 2.594  | 0.01741                        | 2.116                            | 2.116                              | -162.26              | 1220.26           | 1058.00             | -0.3316                    | 2.6956            | 2.3640              | -7                     |
| -6                     | 1.344                                  | 2.737  | 0.01741                        | 2.010                            | 2.010                              | -161.79              | 1220.23           | 1058.44             | -0.3306                    | 2.6896            | 2.3590              | -6                     |
| -5                     | 1.419                                  | 2.888  | 0.01741                        | 1.909                            | 1.909                              | -161.33              | 1220.21           | 1058.88             | -0.3295                    | 2.6836            | 2.3541              | -5                     |
| -4                     | 1.496                                  | 3.047  | 0.01742                        | 1.814                            | 1.814                              | -160.86              | 1220.18           | 1059.32             | -0.3285                    | 2.6777            | 2.3492              | -4                     |
| -3                     | 1.578                                  | 3.213  | 0.01742                        | 1.723                            | 1.723                              | -160.39              | 1220.15           | 1059.76             | -0.3275                    | 2.6718            | 2.3443              | -3                     |
| -2                     | 1.664                                  | 3.388  | 0.01742                        | 1.638                            | 1.638                              | -159.92              | 1220.13           | 1060.21             | -0.3264                    | 2.6658            | 2.3394              | -2                     |
| -1                     | 1.754                                  | 3.572  | 0.01742                        | 1.557                            | 1.557                              | -159.45              | 1220.10           | 1060.65             | -0.3254                    | 2.6600            | 2.3346              | -1                     |

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| FAHR.<br>TEMP.<br>(°F) | ABSOLUTE PRESSURE<br>$p_s$ |         | SPECIFIC VOLUME, CU. FT PER LB |                                  |                                    | ENTHALPY, BTU PER LB |                   |                     | ENTROPY, BTU PER (LB) (°F) |                   |                     | FAHR.<br>TEMP.<br>(°F) |
|------------------------|----------------------------|---------|--------------------------------|----------------------------------|------------------------------------|----------------------|-------------------|---------------------|----------------------------|-------------------|---------------------|------------------------|
|                        | Lb/Sq In.                  | In. Hg  | Sat. Solid<br>$v_f$            | Evap.<br>$v_{fg} \times 10^{-4}$ | Sat. Vapor<br>$v_g \times 10^{-4}$ | Sat. Solid<br>$h_f$  | Evap.<br>$h_{fg}$ | Sat. Vapor<br>$h_g$ | Sat. Solid<br>$s_f$        | Evap.<br>$s_{fg}$ | Sat. Vapor<br>$s_g$ |                        |
| 0                      | 0.01849                    | 0.03764 | 0.01742                        | 14.81                            | 14.81                              | -158.98              | 1220.07           | 1081.09             | -0.3244                    | 2.8541            | 2.3297              | 0                      |
| 1                      | 0.01948                    | 0.03966 | 0.01742                        | 14.08                            | 14.08                              | -158.51              | 1220.04           | 1081.53             | -0.3234                    | 2.8483            | 2.3249              | 1                      |
| 2                      | 0.02052                    | 0.04178 | 0.01742                        | 13.40                            | 13.40                              | -158.04              | 1220.01           | 1081.97             | -0.3224                    | 2.8425            | 2.3201              | 2                      |
| 3                      | 0.02161                    | 0.04400 | 0.01743                        | 12.75                            | 12.75                              | -157.56              | 1219.97           | 1082.41             | -0.3213                    | 2.8367            | 2.3154              | 3                      |
| 4                      | 0.02276                    | 0.04633 | 0.01743                        | 12.14                            | 12.14                              | -157.09              | 1219.94           | 1082.85             | -0.3203                    | 2.8309            | 2.3106              | 4                      |
| 5                      | 0.02396                    | 0.04878 | 0.01743                        | 11.55                            | 11.55                              | -156.61              | 1219.90           | 1083.29             | -0.3193                    | 2.8252            | 2.3059              | 5                      |
| 6                      | 0.02521                    | 0.05134 | 0.01743                        | 11.00                            | 11.00                              | -156.14              | 1219.88           | 1083.74             | -0.3182                    | 2.8194            | 2.3012              | 6                      |
| 7                      | 0.02653                    | 0.05402 | 0.01743                        | 10.48                            | 10.48                              | -155.66              | 1219.84           | 1084.18             | -0.3172                    | 2.8138            | 2.2966              | 7                      |
| 8                      | 0.02791                    | 0.05683 | 0.01743                        | 9.979                            | 9.979                              | -155.18              | 1219.80           | 1084.62             | -0.3162                    | 2.8081            | 2.2919              | 8                      |
| 9                      | 0.02936                    | 0.05977 | 0.01744                        | 9.507                            | 9.507                              | -154.70              | 1219.76           | 1085.06             | -0.3152                    | 2.8025            | 2.2873              | 9                      |
| 10                     | 0.03087                    | 0.06288 | 0.01744                        | 9.060                            | 9.060                              | -154.22              | 1219.72           | 1085.50             | -0.3142                    | 2.7969            | 2.2827              | 10                     |
| 11                     | 0.03240                    | 0.06608 | 0.01744                        | 8.636                            | 8.636                              | -153.74              | 1219.68           | 1085.94             | -0.3131                    | 2.7912            | 2.2781              | 11                     |
| 12                     | 0.03412                    | 0.06946 | 0.01744                        | 8.234                            | 8.234                              | -153.26              | 1219.64           | 1086.38             | -0.3121                    | 2.7857            | 2.2736              | 12                     |
| 13                     | 0.03585                    | 0.07300 | 0.01744                        | 7.851                            | 7.851                              | -152.77              | 1219.59           | 1086.82             | -0.3111                    | 2.7801            | 2.2690              | 13                     |
| 14                     | 0.03767                    | 0.07669 | 0.01744                        | 7.489                            | 7.489                              | -152.29              | 1219.55           | 1087.26             | -0.3101                    | 2.7746            | 2.2645              | 14                     |
| 15                     | 0.03957                    | 0.08056 | 0.01744                        | 7.144                            | 7.144                              | -151.80              | 1219.50           | 1087.70             | -0.3090                    | 2.7690            | 2.2600              | 15                     |
| 16                     | 0.04156                    | 0.08461 | 0.01745                        | 6.817                            | 6.817                              | -151.32              | 1219.46           | 1088.14             | -0.3080                    | 2.7635            | 2.2555              | 16                     |
| 17                     | 0.04363                    | 0.08884 | 0.01745                        | 6.505                            | 6.505                              | -150.83              | 1219.41           | 1088.58             | -0.3070                    | 2.7581            | 2.2511              | 17                     |
| 18                     | 0.04581                    | 0.09328 | 0.01745                        | 6.210                            | 6.210                              | -150.34              | 1219.36           | 1089.02             | -0.3060                    | 2.7526            | 2.2466              | 18                     |
| 19                     | 0.04808                    | 0.09789 | 0.01745                        | 5.929                            | 5.929                              | -149.85              | 1219.31           | 1089.46             | -0.3049                    | 2.7471            | 2.2422              | 19                     |
| 20                     | 0.05045                    | 0.1027  | 0.01745                        | 5.662                            | 5.662                              | -149.36              | 1219.26           | 1089.90             | -0.3039                    | 2.7417            | 2.2378              | 20                     |
| 21                     | 0.05293                    | 0.1078  | 0.01745                        | 5.408                            | 5.408                              | -148.87              | 1219.21           | 1090.34             | -0.3029                    | 2.7364            | 2.2335              | 21                     |
| 22                     | 0.05552                    | 0.1130  | 0.01746                        | 5.166                            | 5.166                              | -148.38              | 1219.16           | 1090.78             | -0.3019                    | 2.7310            | 2.2291              | 22                     |
| 23                     | 0.05823                    | 0.1186  | 0.01746                        | 4.936                            | 4.936                              | -147.88              | 1219.10           | 1091.22             | -0.3008                    | 2.7256            | 2.2248              | 23                     |
| 24                     | 0.06105                    | 0.1243  | 0.01746                        | 4.717                            | 4.717                              | -147.39              | 1219.05           | 1091.66             | -0.2998                    | 2.7203            | 2.2205              | 24                     |
| 25                     | 0.06400                    | 0.1303  | 0.01746                        | 4.509                            | 4.509                              | -146.90              | 1218.98           | 1092.09             | -0.2988                    | 2.7150            | 2.2162              | 25                     |
| 26                     | 0.06708                    | 0.1366  | 0.01746                        | 4.311                            | 4.311                              | -146.40              | 1218.93           | 1092.53             | -0.2978                    | 2.7097            | 2.2119              | 26                     |
| 27                     | 0.07030                    | 0.1431  | 0.01746                        | 4.122                            | 4.122                              | -145.90              | 1218.87           | 1092.97             | -0.2968                    | 2.7045            | 2.2077              | 27                     |
| 28                     | 0.07365                    | 0.1500  | 0.01746                        | 3.943                            | 3.943                              | -145.40              | 1218.81           | 1093.41             | -0.2957                    | 2.6991            | 2.2034              | 28                     |
| 29                     | 0.07715                    | 0.1571  | 0.01747                        | 3.771                            | 3.771                              | -144.90              | 1218.75           | 1093.85             | -0.2947                    | 2.6939            | 2.1992              | 29                     |
| 30                     | 0.08080                    | 0.1645  | 0.01747                        | 3.608                            | 3.608                              | -144.40              | 1218.69           | 1094.29             | -0.2937                    | 2.6887            | 2.1950              | 30                     |
| 31                     | 0.08461                    | 0.1723  | 0.01747                        | 3.453                            | 3.453                              | -143.90              | 1218.63           | 1094.73             | -0.2927                    | 2.6835            | 2.1908              | 31                     |
| 32                     | 0.08858                    | 0.1803  | 0.01747                        | 3.305                            | 3.305                              | -143.40              | 1218.56           | 1095.16             | -0.2916                    | 2.6783            | 2.1867              | 32                     |

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