

Table 5.18(h) Banded weather data: Manchester

| Hour | Dry-bulb / °C | Incident solar irradiation / W·m ⁻² | | | | | | | | | |
|------------|---------------|--|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| | | Horizontal | | N | | NE | | E | | SE | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse |
| May | | | | | | | | | | | |
| 1 | 11.21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 10.83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 10.70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 10.81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 11.17 | 18 | 38 | 54 | 39 | 125 | 54 | 122 | 54 | 48 | 38 |
| 6 | 11.75 | 59 | 81 | 44 | 66 | 172 | 94 | 199 | 100 | 110 | 81 |
| 7 | 12.50 | 114 | 125 | 3 | 87 | 175 | 126 | 245 | 141 | 171 | 125 |
| 8 | 13.38 | 169 | 170 | 0 | 94 | 138 | 148 | 246 | 173 | 210 | 164 |
| 9 | 14.33 | 217 | 213 | 0 | 119 | 77 | 163 | 213 | 195 | 225 | 198 |
| 10 | 15.27 | 255 | 250 | 0 | 140 | 6 | 170 | 156 | 207 | 215 | 221 |
| 11 | 16.16 | 279 | 277 | 0 | 154 | 0 | 154 | 83 | 206 | 183 | 232 |
| 12 | 16.93 | 287 | 287 | 0 | 160 | 0 | 160 | 0 | 160 | 132 | 225 |
| 13 | 17.52 | 279 | 277 | 0 | 154 | 0 | 154 | 0 | 154 | 67 | 202 |
| 14 | 17.89 | 255 | 250 | 0 | 140 | 0 | 140 | 0 | 140 | 0 | 140 |
| 15 | 18.02 | 217 | 213 | 0 | 119 | 0 | 119 | 0 | 119 | 0 | 119 |
| 16 | 17.91 | 169 | 170 | 0 | 95 | 0 | 95 | 0 | 95 | 0 | 95 |
| 17 | 17.55 | 115 | 126 | 4 | 88 | 0 | 69 | 0 | 69 | 0 | 69 |
| 18 | 16.98 | 60 | 81 | 44 | 67 | 0 | 43 | 0 | 43 | 0 | 43 |
| 19 | 16.22 | 18 | 39 | 54 | 39 | 0 | 20 | 0 | 20 | 0 | 20 |
| 20 | 15.34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 14.40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 13.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 12.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 11.80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Hour | Dry-bulb / °C | Incident solar irradiation / W·m ⁻² | | | | | | | | Altitude | Azimuth |
|------|---------------|--|---------|--------|---------|--------|---------|--------|---------|----------|---------|
| | | S | | SW | | W | | NW | | | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | | |
| 1 | 11.21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.58 |
| 2 | 10.83 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28.65 |
| 3 | 10.70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 41.92 |
| 4 | 10.81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54.34 |
| 5 | 11.17 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 7.65 | 66.10 |
| 6 | 11.75 | 0 | 43 | 0 | 43 | 0 | 43 | 0 | 43 | 16.15 | 77.57 |
| 7 | 12.50 | 0 | 69 | 0 | 69 | 0 | 69 | 0 | 69 | 25.03 | 89.23 |
| 8 | 13.38 | 51 | 128 | 0 | 94 | 0 | 94 | 0 | 94 | 33.93 | 101.77 |
| 9 | 14.33 | 105 | 169 | 0 | 119 | 0 | 119 | 0 | 119 | 42.39 | 116.11 |
| 10 | 15.27 | 148 | 205 | 0 | 140 | 0 | 140 | 0 | 140 | 49.75 | 133.47 |
| 11 | 16.16 | 177 | 230 | 67 | 202 | 0 | 154 | 0 | 154 | 55.01 | 154.96 |
| 12 | 16.93 | 187 | 239 | 132 | 225 | 0 | 191 | 0 | 160 | 56.97 | 180.00 |
| 13 | 17.52 | 177 | 230 | 183 | 232 | 83 | 206 | 0 | 154 | 55.02 | 205.05 |
| 14 | 17.89 | 148 | 205 | 215 | 221 | 156 | 207 | 6 | 170 | 49.78 | 226.55 |
| 15 | 18.02 | 104 | 169 | 225 | 198 | 213 | 195 | 77 | 163 | 42.43 | 243.93 |
| 16 | 17.91 | 51 | 128 | 210 | 165 | 246 | 173 | 138 | 148 | 33.98 | 258.28 |
| 17 | 17.55 | 0 | 69 | 171 | 125 | 245 | 141 | 176 | 126 | 25.09 | 270.82 |
| 18 | 16.98 | 0 | 43 | 110 | 81 | 200 | 100 | 173 | 94 | 16.22 | 282.50 |
| 19 | 16.22 | 0 | 20 | 48 | 38 | 122 | 54 | 125 | 55 | 7.74 | 293.97 |
| 20 | 15.34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305.73 |
| 21 | 14.40 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 318.15 |
| 22 | 13.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 331.40 |
| 23 | 12.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 345.45 |
| 24 | 11.80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360.00 |

Dirfac = 0.39; Diffac = 1.00; Maximum dry-bulb = 18.02 °C; Minimum dry-bulb = 10.7 °C; Adaptive comfort range = 21.6–25.6 °C

Table continues

Table 5.18(h) Banded weather data: Manchester — *continued*

| Hour | Dry-bulb /°C | Incident solar irradiation / W·m ⁻² | | | | | | | | | |
|-------------|-----------------|--|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| | | Horizontal | | N | | NE | | E | | SE | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse |
| June | | | | | | | | | | | |
| 1 | 14.61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 14.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 14.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 14.38 | 0 | 14 | 5 | 13 | 8 | 20 | 6 | 16 | 1 | 4 |
| 5 | 14.61 | 5 | 54 | 12 | 28 | 26 | 28 | 25 | 28 | 9 | 28 |
| 6 | 14.97 | 14 | 98 | 10 | 73 | 35 | 79 | 39 | 80 | 20 | 75 |
| 7 | 15.45 | 24 | 145 | 2 | 105 | 34 | 112 | 45 | 115 | 30 | 111 |
| 8 | 16.00 | 33 | 192 | 0 | 91 | 27 | 145 | 45 | 149 | 37 | 147 |
| 9 | 16.60 | 42 | 238 | 0 | 113 | 15 | 175 | 39 | 180 | 39 | 181 |
| 10 | 17.20 | 49 | 278 | 0 | 132 | 3 | 200 | 28 | 207 | 37 | 209 |
| 11 | 17.75 | 53 | 308 | 0 | 146 | 0 | 146 | 15 | 224 | 32 | 229 |
| 12 | 18.23 | 55 | 319 | 0 | 151 | 0 | 151 | 0 | 151 | 22 | 234 |
| 13 | 18.59 | 53 | 308 | 0 | 146 | 0 | 146 | 0 | 146 | 10 | 223 |
| 14 | 18.82 | 49 | 278 | 0 | 132 | 0 | 132 | 0 | 132 | 0 | 132 |
| 15 | 18.90 | 42 | 238 | 0 | 113 | 0 | 113 | 0 | 113 | 0 | 113 |
| 16 | 18.82 | 33 | 192 | 0 | 91 | 0 | 91 | 0 | 91 | 0 | 91 |
| 17 | 18.59 | 24 | 145 | 2 | 105 | 0 | 68 | 0 | 68 | 0 | 68 |
| 18 | 18.23 | 14 | 98 | 10 | 73 | 0 | 46 | 0 | 46 | 0 | 46 |
| 19 | 17.75 | 5 | 54 | 12 | 28 | 0 | 25 | 0 | 25 | 0 | 25 |
| 20 | 17.20 | 0 | 14 | 5 | 13 | 0 | 6 | 0 | 6 | 0 | 6 |
| 21 | 16.60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 16.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 15.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 14.97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Hour | Dry-bulb /°C | Incident solar irradiation / W·m ⁻² | | | | | | | | Altitude | Azimuth |
|------|-----------------|--|---------|--------|---------|--------|---------|--------|---------|----------|---------|
| | | S | | SW | | W | | NW | | | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | | |
| 1 | 14.61 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.06 |
| 2 | 14.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27.67 |
| 3 | 14.30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40.56 |
| 4 | 14.38 | 0 | 6 | 0 | 6 | 0 | 6 | 0 | 6 | 2.6 | 52.69 |
| 5 | 14.61 | 0 | 25 | 0 | 25 | 0 | 25 | 0 | 25 | 10.22 | 64.23 |
| 6 | 14.97 | 0 | 46 | 0 | 46 | 0 | 46 | 0 | 46 | 18.61 | 75.49 |
| 7 | 15.45 | 0 | 68 | 0 | 68 | 0 | 68 | 0 | 68 | 27.44 | 86.98 |
| 8 | 16.00 | 7 | 140 | 0 | 91 | 0 | 91 | 0 | 91 | 36.36 | 99.34 |
| 9 | 16.60 | 17 | 175 | 0 | 113 | 0 | 113 | 0 | 113 | 44.94 | 113.58 |
| 10 | 17.20 | 25 | 206 | 0 | 132 | 0 | 132 | 0 | 132 | 52.5 | 131.10 |
| 11 | 17.75 | 30 | 229 | 10 | 223 | 0 | 146 | 0 | 146 | 58 | 153.38 |
| 12 | 18.23 | 31 | 237 | 22 | 234 | 0 | 151 | 0 | 151 | 60.08 | 180.00 |
| 13 | 18.59 | 30 | 229 | 32 | 229 | 15 | 224 | 0 | 146 | 58 | 206.62 |
| 14 | 18.82 | 25 | 206 | 37 | 209 | 28 | 207 | 3 | 200 | 52.5 | 228.90 |
| 15 | 18.90 | 17 | 175 | 39 | 181 | 39 | 180 | 15 | 175 | 44.94 | 246.42 |
| 16 | 18.82 | 7 | 140 | 37 | 147 | 45 | 149 | 27 | 145 | 36.36 | 260.66 |
| 17 | 18.59 | 0 | 68 | 30 | 111 | 45 | 115 | 34 | 112 | 27.44 | 273.02 |
| 18 | 18.23 | 0 | 46 | 20 | 75 | 39 | 80 | 35 | 79 | 18.61 | 284.50 |
| 19 | 17.75 | 0 | 25 | 9 | 28 | 25 | 28 | 26 | 28 | 10.22 | 295.77 |
| 20 | 17.20 | 0 | 6 | 1 | 4 | 6 | 16 | 8 | 20 | 2.6 | 307.31 |
| 21 | 16.60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 319.44 |
| 22 | 16.00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 332.33 |
| 23 | 15.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 345.94 |
| 24 | 14.97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360.00 |

Dirfac = 0.07; Diffac = 1.06; Maximum dry-bulb = 18.90 °C; Minimum dry-bulb = 14.3 °C; Adaptive comfort range = 22.1–26.1 °C

Table continues

Table 5.18(h) Banded weather data: Manchester — *continued*

| Hour | Dry-bulb / °C | Incident solar irradiation / W·m ⁻² | | | | | | | | | |
|-------------|---------------|--|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| | | Horizontal | | N | | NE | | E | | SE | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse |
| July | | | | | | | | | | | |
| 1 | 16.13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 15.36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 14.91 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 14.81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 15.05 | 27 | 35 | 83 | 42 | 193 | 65 | 190 | 64 | 75 | 40 |
| 6 | 15.63 | 90 | 75 | 67 | 66 | 266 | 107 | 309 | 116 | 171 | 88 |
| 7 | 16.51 | 176 | 117 | 4 | 80 | 272 | 137 | 382 | 160 | 267 | 136 |
| 8 | 17.62 | 261 | 160 | 0 | 99 | 214 | 153 | 384 | 190 | 329 | 178 |
| 9 | 18.90 | 337 | 200 | 0 | 125 | 119 | 158 | 334 | 207 | 353 | 211 |
| 10 | 20.24 | 395 | 235 | 0 | 147 | 8 | 154 | 245 | 210 | 338 | 232 |
| 11 | 21.57 | 433 | 260 | 0 | 162 | 0 | 162 | 129 | 198 | 288 | 237 |
| 12 | 22.79 | 446 | 270 | 0 | 168 | 0 | 168 | 0 | 168 | 208 | 223 |
| 13 | 23.81 | 433 | 260 | 0 | 162 | 0 | 162 | 0 | 162 | 106 | 193 |
| 14 | 24.58 | 395 | 235 | 0 | 147 | 0 | 147 | 0 | 147 | 0 | 147 |
| 15 | 25.03 | 336 | 200 | 0 | 125 | 0 | 125 | 0 | 125 | 0 | 125 |
| 16 | 25.13 | 261 | 159 | 0 | 99 | 0 | 99 | 0 | 99 | 0 | 99 |
| 17 | 24.89 | 176 | 117 | 3 | 80 | 0 | 71 | 0 | 71 | 0 | 71 |
| 18 | 24.31 | 89 | 75 | 67 | 66 | 0 | 43 | 0 | 43 | 0 | 43 |
| 19 | 23.43 | 27 | 35 | 83 | 42 | 0 | 18 | 0 | 18 | 0 | 18 |
| 20 | 22.32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 21.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 19.70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 18.37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 17.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Hour | Dry-bulb / °C | Incident solar irradiation / W·m ⁻² | | | | | | | | Altitude | Azimuth |
|------|---------------|--|---------|--------|---------|--------|---------|--------|---------|----------|---------|
| | | S | | SW | | W | | NW | | | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | | |
| 1 | 16.13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14.61 |
| 2 | 15.36 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 28.73 |
| 3 | 14.91 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42.02 |
| 4 | 14.81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 54.47 |
| 5 | 15.05 | 0 | 19 | 0 | 19 | 0 | 19 | 0 | 19 | 7.42 | 66.26 |
| 6 | 15.63 | 0 | 43 | 0 | 43 | 0 | 43 | 0 | 43 | 15.91 | 77.76 |
| 7 | 16.51 | 0 | 71 | 0 | 71 | 0 | 71 | 0 | 71 | 24.79 | 89.45 |
| 8 | 17.62 | 82 | 124 | 0 | 99 | 0 | 99 | 0 | 99 | 33.67 | 102.02 |
| 9 | 18.90 | 165 | 169 | 0 | 125 | 0 | 125 | 0 | 125 | 42.11 | 116.38 |
| 10 | 20.24 | 234 | 207 | 0 | 147 | 0 | 147 | 0 | 147 | 49.43 | 133.73 |
| 11 | 21.57 | 279 | 234 | 106 | 193 | 0 | 162 | 0 | 162 | 54.64 | 155.14 |
| 12 | 22.79 | 294 | 244 | 208 | 223 | 0 | 173 | 0 | 168 | 56.57 | 180.00 |
| 13 | 23.81 | 279 | 234 | 288 | 237 | 129 | 198 | 0 | 162 | 54.62 | 204.85 |
| 14 | 24.58 | 234 | 207 | 339 | 232 | 245 | 210 | 7 | 154 | 49.4 | 226.25 |
| 15 | 25.03 | 166 | 169 | 353 | 211 | 334 | 207 | 119 | 158 | 42.06 | 243.58 |
| 16 | 25.13 | 82 | 124 | 329 | 178 | 384 | 190 | 213 | 153 | 33.62 | 257.93 |
| 17 | 24.89 | 0 | 71 | 267 | 136 | 381 | 160 | 272 | 137 | 24.72 | 270.49 |
| 18 | 24.31 | 0 | 43 | 171 | 87 | 308 | 116 | 265 | 107 | 15.83 | 282.18 |
| 19 | 23.43 | 0 | 18 | 75 | 40 | 189 | 63 | 192 | 64 | 7.32 | 293.67 |
| 20 | 22.32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305.46 |
| 21 | 21.04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 317.91 |
| 22 | 19.70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 331.22 |
| 23 | 18.37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 345.35 |
| 24 | 17.15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360.00 |

Dirfac = 0.61; Diffac = 0.95; Maximum dry-bulb = 25.14 °C; Minimum dry-bulb = 14.8 °C; Adaptive comfort range = 23.5–27.5 °C

Table continues

Table 5.18(h) Banded weather data: Manchester — *continued*

| Hour | Dry-bulb /°C | Incident solar irradiation / W·m ⁻² | | | | | | | | | |
|---------------|-----------------|--|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| | | Horizontal | | N | | NE | | E | | SE | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse |
| August | | | | | | | | | | | |
| 1 | 17.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 16.59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 16.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 16.41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 16.66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 17.13 | 8 | 45 | 6 | 34 | 42 | 42 | 53 | 45 | 33 | 40 |
| 7 | 17.77 | 26 | 92 | 0 | 44 | 52 | 77 | 82 | 84 | 63 | 80 |
| 8 | 18.56 | 47 | 137 | 0 | 67 | 42 | 107 | 90 | 118 | 84 | 117 |
| 9 | 19.42 | 66 | 179 | 0 | 88 | 21 | 132 | 81 | 146 | 93 | 149 |
| 10 | 20.31 | 80 | 214 | 0 | 106 | 0 | 106 | 60 | 166 | 91 | 174 |
| 11 | 21.16 | 90 | 238 | 0 | 118 | 0 | 118 | 32 | 176 | 80 | 188 |
| 12 | 21.92 | 93 | 247 | 0 | 122 | 0 | 122 | 0 | 122 | 60 | 190 |
| 13 | 22.53 | 90 | 238 | 0 | 118 | 0 | 118 | 0 | 118 | 35 | 177 |
| 14 | 22.95 | 80 | 214 | 0 | 106 | 0 | 106 | 0 | 106 | 7 | 153 |
| 15 | 23.16 | 66 | 179 | 0 | 88 | 0 | 88 | 0 | 88 | 0 | 88 |
| 16 | 23.13 | 47 | 136 | 0 | 67 | 0 | 67 | 0 | 67 | 0 | 67 |
| 17 | 22.88 | 26 | 91 | 0 | 44 | 0 | 44 | 0 | 44 | 0 | 44 |
| 18 | 22.41 | 8 | 45 | 6 | 34 | 0 | 21 | 0 | 21 | 0 | 21 |
| 19 | 21.77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 20.98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 20.12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 19.23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 18.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 17.62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Hour | Dry-bulb /°C | Incident solar irradiation / W·m ⁻² | | | | | | | | Altitude | Azimuth |
|------|-----------------|--|---------|--------|---------|--------|---------|--------|---------|----------|---------|
| | | S | | SW | | W | | NW | | | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | | |
| 1 | 17.01 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16.19 |
| 2 | 16.59 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31.65 |
| 3 | 16.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45.98 |
| 4 | 16.41 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 59.16 |
| 5 | 16.66 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.06 | 71.49 |
| 6 | 17.13 | 0 | 22 | 0 | 22 | 0 | 22 | 0 | 22 | 8.77 | 83.41 |
| 7 | 17.77 | 8 | 67 | 0 | 44 | 0 | 44 | 0 | 44 | 17.7 | 95.46 |
| 8 | 18.56 | 30 | 104 | 0 | 67 | 0 | 67 | 0 | 67 | 26.43 | 108.27 |
| 9 | 19.42 | 52 | 139 | 0 | 88 | 0 | 88 | 0 | 88 | 34.49 | 122.61 |
| 10 | 20.31 | 69 | 169 | 7 | 153 | 0 | 106 | 0 | 106 | 41.24 | 139.24 |
| 11 | 21.16 | 81 | 189 | 35 | 177 | 0 | 118 | 0 | 118 | 45.86 | 158.60 |
| 12 | 21.92 | 85 | 196 | 60 | 190 | 0 | 175 | 0 | 122 | 47.51 | 180.00 |
| 13 | 22.53 | 81 | 189 | 80 | 188 | 32 | 176 | 0 | 118 | 45.83 | 201.39 |
| 14 | 22.95 | 70 | 168 | 92 | 174 | 60 | 166 | 0 | 106 | 41.19 | 220.73 |
| 15 | 23.16 | 52 | 139 | 93 | 149 | 81 | 146 | 20 | 132 | 34.42 | 237.34 |
| 16 | 23.13 | 30 | 104 | 84 | 117 | 90 | 118 | 42 | 107 | 26.34 | 251.65 |
| 17 | 22.88 | 8 | 67 | 63 | 79 | 81 | 83 | 52 | 77 | 17.58 | 264.45 |
| 18 | 22.41 | 0 | 21 | 33 | 40 | 53 | 44 | 41 | 41 | 8.63 | 276.48 |
| 19 | 21.77 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 288.39 |
| 20 | 20.98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 300.72 |
| 21 | 20.12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 313.91 |
| 22 | 19.23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 328.25 |
| 23 | 18.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 343.75 |
| 24 | 17.62 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360.00 |

Dirfac = 0.15; Diffac = 1.04; Maximum dry-bulb = 23.18 °C; Minimum dry-bulb = 16.36 °C; Adaptive comfort range = 23.2–27.2 °C

Table continues

Table 5.18(h) Banded weather data: Manchester — *continued*

| Hour | Dry-bulb /°C | Incident solar irradiation / W·m ⁻² | | | | | | | | | |
|------------------|-----------------|--|---------|--------|---------|--------|---------|--------|---------|----------|---------|
| | | Horizontal | | N | | NE | | E | | SE | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse |
| September | | | | | | | | | | | |
| 1 | 16.39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 15.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 14.60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 14.12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 13.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6 | 14.12 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 7 | 14.60 | 14 | 52 | 0 | 25 | 48 | 49 | 86 | 58 | 74 | 55 |
| 8 | 15.38 | 42 | 101 | 0 | 50 | 46 | 83 | 120 | 101 | 124 | 102 |
| 9 | 16.39 | 71 | 145 | 0 | 73 | 17 | 106 | 119 | 132 | 151 | 140 |
| 10 | 17.56 | 95 | 181 | 0 | 92 | 0 | 92 | 91 | 150 | 154 | 166 |
| 11 | 18.82 | 110 | 205 | 0 | 104 | 0 | 104 | 49 | 155 | 139 | 178 |
| 12 | 20.09 | 115 | 213 | 0 | 109 | 0 | 109 | 0 | 109 | 109 | 176 |
| 13 | 21.26 | 110 | 205 | 0 | 104 | 0 | 104 | 0 | 104 | 69 | 160 |
| 14 | 22.27 | 94 | 181 | 0 | 92 | 0 | 92 | 0 | 92 | 25 | 132 |
| 15 | 23.05 | 71 | 145 | 0 | 73 | 0 | 73 | 0 | 73 | 0 | 73 |
| 16 | 23.53 | 41 | 101 | 0 | 50 | 0 | 50 | 0 | 50 | 0 | 50 |
| 17 | 23.70 | 14 | 51 | 0 | 25 | 0 | 25 | 0 | 25 | 0 | 25 |
| 18 | 23.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 23.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 22.27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 21 | 21.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 22 | 20.09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 18.82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 17.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Hour | Dry-bulb /°C | Incident solar irradiation / W·m ⁻² | | | | | | | | Altitude | Azimuth |
| | | S | | SW | | W | | NW | | | |
| | | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | Direct | Diffuse | | |
| 1 | 16.39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18.41 |
| 2 | 15.38 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35.65 |
| 3 | 14.60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51.16 |
| 4 | 14.12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65.04 |
| 5 | 13.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 77.77 |
| 6 | 14.12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.12 | 89.91 |
| 7 | 14.60 | 18 | 42 | 0 | 25 | 0 | 25 | 0 | 25 | 8.99 | 102.06 |
| 8 | 15.38 | 55 | 85 | 0 | 50 | 0 | 50 | 0 | 50 | 17.46 | 114.79 |
| 9 | 16.39 | 95 | 126 | 0 | 73 | 0 | 73 | 0 | 73 | 25.05 | 128.69 |
| 10 | 17.56 | 127 | 159 | 25 | 133 | 0 | 92 | 0 | 92 | 31.2 | 144.23 |
| 11 | 18.82 | 147 | 181 | 69 | 160 | 0 | 104 | 0 | 104 | 35.27 | 161.52 |
| 12 | 20.09 | 154 | 188 | 109 | 176 | 0 | 148 | 0 | 109 | 36.69 | 180.00 |
| 13 | 21.26 | 147 | 181 | 139 | 178 | 49 | 155 | 0 | 104 | 35.24 | 198.47 |
| 14 | 22.27 | 127 | 158 | 154 | 166 | 91 | 149 | 0 | 92 | 31.14 | 215.74 |
| 15 | 23.05 | 95 | 125 | 151 | 139 | 118 | 131 | 17 | 105 | 24.96 | 231.26 |
| 16 | 23.53 | 55 | 85 | 124 | 102 | 120 | 101 | 45 | 82 | 17.35 | 245.14 |
| 17 | 23.70 | 18 | 41 | 73 | 55 | 85 | 58 | 47 | 48 | 8.86 | 257.85 |
| 18 | 23.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 269.97 |
| 19 | 23.05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 282.10 |
| 20 | 22.27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 294.81 |
| 21 | 21.26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 308.69 |
| 22 | 20.09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 324.22 |
| 23 | 18.82 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 341.50 |
| 24 | 17.56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 360.00 |

Dirfac = 0.24; Diffac = 1.16; Maximum dry-bulb = 23.70 °C; Minimum dry-bulb = 13.95 °C; Adaptive comfort range = 22.8–26.8 °C