

**Table 2.20(h)** Annual and seasonal average percentage frequencies of hourly wind speed by temperature: Manchester (1982–2011)

| Temperature / °C      | Percentage frequency for stated range of wind speed / m·s <sup>-1</sup> |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
|-----------------------|---|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
|                       | 0–2   | 2–4   | 4–6   | 6–8   | 8–10 | 10–12 | 12–14 | 14–16 | 16–18 | 18–20 | 20–22 | 22–24 | 24–26 | 26–28 | 28–30 | 30–32 | All speeds |
| <b>Annual average</b> |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| –12 to –10.1          | 0.02  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.02       |
| –10 to –8.1           | 0.03  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.03       |
| –8 to –6.1            | 0.10  | 0.01  |       |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.11       |
| –6 to –4.1            | 0.26  | 0.03  | 0.01  | 0.01  |      |       |       |       |       |       |       |       |       |       |       |       | 0.31       |
| –4 to –2.1            | 0.66  | 0.15  | 0.04  | 0.02  | 0.01 | 0.01  |       |       |       |       |       |       |       |       |       |       | 0.89       |
| –2 to –0.1            | 1.24  | 0.66  | 0.19  | 0.09  | 0.06 | 0.02  |       |       |       |       |       |       |       |       |       |       | 2.26       |
| 0 to 1.9              | 1.75  | 1.68  | 0.72  | 0.28  | 0.13 | 0.03  | 0.01  |       |       |       |       |       |       |       |       |       | 4.60       |
| 2 to 3.9              | 2.04  | 2.51  | 1.65  | 0.73  | 0.27 | 0.09  | 0.02  |       |       |       |       |       |       |       |       |       | 7.31       |
| 4 to 5.9              | 2.13  | 3.25  | 2.59  | 1.38  | 0.53 | 0.16  | 0.03  | 0.01  |       |       |       |       |       |       |       |       | 10.08      |
| 6 to 7.9              | 2.24  | 3.60  | 3.22  | 1.98  | 0.78 | 0.23  | 0.05  | 0.01  |       |       |       |       |       |       |       |       | 12.11      |
| 8 to 9.9              | 2.27  | 3.77  | 3.45  | 2.18  | 0.91 | 0.29  | 0.05  | 0.01  |       |       |       |       |       |       |       |       | 12.93      |
| 10 to 11.9            | 2.39  | 3.98  | 3.37  | 1.99  | 0.83 | 0.29  | 0.06  | 0.01  |       |       |       |       |       |       |       |       | 12.92      |
| 12 to 13.9            | 2.18  | 4.12  | 3.44  | 1.73  | 0.61 | 0.19  | 0.04  | 0.01  |       |       |       |       |       |       |       |       | 12.32      |
| 14 to 15.9            | 1.65  | 3.43  | 3.02  | 1.47  | 0.40 | 0.10  | 0.01  |       |       |       |       |       |       |       |       |       | 10.08      |
| 16 to 17.9            | 1.04  | 2.25  | 2.16  | 1.01  | 0.22 | 0.04  |       |       |       |       |       |       |       |       |       |       | 6.72       |
| 18 to 19.9            | 0.54  | 1.32  | 1.10  | 0.44  | 0.11 | 0.03  |       |       |       |       |       |       |       |       |       |       | 3.54       |
| 20 to 21.9            | 0.28  | 0.73  | 0.62  | 0.23  | 0.06 | 0.01  |       |       |       |       |       |       |       |       |       |       | 1.93       |
| 22 to 23.9            | 0.16  | 0.42  | 0.29  | 0.11  | 0.03 |       |       |       |       |       |       |       |       |       |       |       | 1.01       |
| 24 to 25.9            | 0.07  | 0.20  | 0.14  | 0.06  | 0.01 |       |       |       |       |       |       |       |       |       |       |       | 0.48       |
| 26 to 27.9            | 0.03  | 0.08  | 0.08  | 0.03  | 0.01 |       |       |       |       |       |       |       |       |       |       |       | 0.23       |
| 28 to 29.9            | 0.01  | 0.02  | 0.02  | 0.01  |      |       |       |       |       |       |       |       |       |       |       |       | 0.06       |
| 30 to 31.9            |   | 0.01  | 0.01  |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.02       |
| 32 to 33.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 34 to 35.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 36 to 37.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| All temps.            | 21.11   | 32.22 | 26.12 | 13.75 | 4.97 | 1.49  | 0.27  | 0.05  |       |       |       |       |       |       |       |       | 99.98      |
| <b>Spring average</b> |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| –12 to –10.1          |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| –10 to –8.1           |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| –8 to –6.1            | 0.03  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.03       |
| –6 to –4.1            | 0.05  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.05       |
| –4 to –2.1            | 0.26  | 0.06  | 0.01  |       |      |       |       |       |       |       |       |       |       |       |       |       | 0.33       |
| –2 to –0.1            | 0.67  | 0.28  | 0.08  | 0.09  | 0.02 |       |       |       |       |       |       |       |       |       |       |       | 1.14       |
| 0 to 1.9              | 1.53  | 1.23  | 0.52  | 0.21  | 0.09 | 0.01  |       |       |       |       |       |       |       |       |       |       | 3.59       |
| 2 to 3.9              | 2.23  | 2.65  | 1.71  | 0.80  | 0.30 | 0.12  | 0.02  |       |       |       |       |       |       |       |       |       | 7.83       |
| 4 to 5.9              | 2.90  | 4.24  | 3.13  | 1.71  | 0.57 | 0.17  | 0.05  | 0.01  |       |       |       |       |       |       |       |       | 12.78      |
| 6 to 7.9              | 3.25  | 5.35  | 4.66  | 2.86  | 0.97 | 0.28  | 0.05  | 0.01  | 0.01  |       |       |       |       |       |       |       | 17.44      |
| 8 to 9.9              | 2.94  | 5.78  | 5.61  | 3.24  | 1.09 | 0.27  | 0.04  | 0.01  |       |       |       |       |       |       |       |       | 18.98      |
| 10 to 11.9            | 2.12  | 4.58  | 4.86  | 2.95  | 0.92 | 0.20  | 0.04  |       |       |       |       |       |       |       |       |       | 15.67      |
| 12 to 13.9            | 1.17  | 2.92  | 3.32  | 2.06  | 0.68 | 0.15  | 0.02  | 0.01  |       |       |       |       |       |       |       |       | 10.33      |
| 14 to 15.9            | 0.70  | 1.81  | 1.87  | 1.04  | 0.39 | 0.11  | 0.01  |       |       |       |       |       |       |       |       |       | 5.93       |
| 16 to 17.9            | 0.41  | 0.93  | 0.97  | 0.55  | 0.19 | 0.04  |       |       |       |       |       |       |       |       |       |       | 3.09       |
| 18 to 19.9            | 0.20  | 0.49  | 0.42  | 0.18  | 0.07 | 0.03  |       |       |       |       |       |       |       |       |       |       | 1.39       |
| 20 to 21.9            | 0.11  | 0.27  | 0.25  | 0.14  | 0.06 | 0.02  |       |       |       |       |       |       |       |       |       |       | 0.85       |
| 22 to 23.9            | 0.06  | 0.13  | 0.16  | 0.05  | 0.04 |       |       |       |       |       |       |       |       |       |       |       | 0.44       |
| 24 to 25.9            | 0.01  | 0.03  | 0.04  | 0.01  |      |       |       |       |       |       |       |       |       |       |       |       | 0.09       |
| 26 to 27.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 28 to 29.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 30 to 31.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 32 to 33.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 34 to 35.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| 36 to 37.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |       |            |
| All temps.            | 18.64   | 30.75 | 27.61 | 15.89 | 5.39 | 1.40  | 0.23  | 0.04  | 0.01  |       |       |       |       |       |       |       | 99.96      |

Table continues

**Table 2.20(h)** Annual and seasonal average percentage frequencies of hourly wind speed by temperature: Manchester (1982–2011) — *continued*

| Temperature / °C      | Percentage frequency for stated range of wind speed / m·s <sup>-1</sup> |       |       |       |      |       |       |       |       |       |       |       |       |       |       | All speeds |       |
|-----------------------|---|-------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|
|                       | 0–2   | 2–4   | 4–6   | 6–8   | 8–10 | 10–12 | 12–14 | 14–16 | 16–18 | 18–20 | 20–22 | 22–24 | 24–26 | 26–28 | 28–30 |            | 30–32 |
| <b>Summer average</b> |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –12 to –10.1          |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –10 to –8.1           |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –8 to –6.1            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –6 to –4.1            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –4 to –2.1            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –2 to –0.1            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 0 to 1.9              |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 2 to 3.9              | 0.10  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.10  |
| 4 to 5.9              | 0.19  | 0.02  |       |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.21  |
| 6 to 7.9              | 0.85  | 0.28  | 0.06  | 0.01  |      |       |       |       |       |       |       |       |       |       |       |            | 1.20  |
| 8 to 9.9              | 2.23  | 1.45  | 0.35  | 0.08  | 0.02 |       |       |       |       |       |       |       |       |       |       |            | 4.13  |
| 10 to 11.9            | 3.81  | 4.68  | 2.08  | 0.63  | 0.12 | 0.03  |       |       |       |       |       |       |       |       |       |            | 11.35 |
| 12 to 13.9            | 4.73  | 7.97  | 5.27  | 1.69  | 0.28 | 0.04  |       |       |       |       |       |       |       |       |       |            | 19.98 |
| 14 to 15.9            | 4.31  | 8.26  | 6.65  | 2.56  | 0.44 | 0.07  |       |       |       |       |       |       |       |       |       |            | 22.29 |
| 16 to 17.9            | 3.03  | 6.28  | 5.81  | 2.34  | 0.36 | 0.04  |       |       |       |       |       |       |       |       |       |            | 17.86 |
| 18 to 19.9            | 1.70  | 4.05  | 3.32  | 1.24  | 0.25 | 0.05  | 0.01  |       |       |       |       |       |       |       |       |            | 10.62 |
| 20 to 21.9            | 0.89  | 2.43  | 1.96  | 0.64  | 0.13 | 0.03  |       |       |       |       |       |       |       |       |       |            | 6.08  |
| 22 to 23.9            | 0.52  | 1.45  | 0.91  | 0.34  | 0.05 | 0.01  |       |       |       |       |       |       |       |       |       |            | 3.28  |
| 24 to 25.9            | 0.26  | 0.71  | 0.45  | 0.21  | 0.04 |       |       |       |       |       |       |       |       |       |       |            | 1.67  |
| 26 to 27.9            | 0.13  | 0.30  | 0.30  | 0.11  | 0.03 |       |       |       |       |       |       |       |       |       |       |            | 0.87  |
| 28 to 29.9            | 0.04  | 0.08  | 0.09  | 0.05  | 0.01 |       |       |       |       |       |       |       |       |       |       |            | 0.27  |
| 30 to 31.9            |   | 0.02  | 0.02  | 0.01  |      |       |       |       |       |       |       |       |       |       |       |            | 0.05  |
| 32 to 33.9            |   |       | 0.01  |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.01  |
| 34 to 35.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 36 to 37.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| All temps.            | 22.79   | 37.98 | 27.28 | 9.91  | 1.73 | 0.27  | 0.01  |       |       |       |       |       |       |       |       |            | 99.97 |
| <b>Autumn average</b> |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –12 to –10.1          |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| –10 to –8.1           | 0.02  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.02  |
| –8 to –6.1            | 0.04  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.04  |
| –6 to –4.1            | 0.15  |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.15  |
| –4 to –2.1            | 0.49  | 0.02  |       |       |      |       |       |       |       |       |       |       |       |       |       |            | 0.51  |
| –2 to –0.1            | 0.98  | 0.15  | 0.02  |       |      |       |       |       |       |       |       |       |       |       |       |            | 1.15  |
| 0 to 1.9              | 1.30  | 0.59  | 0.19  | 0.03  | 0.01 | 0.01  |       |       |       |       |       |       |       |       |       |            | 2.13  |
| 2 to 3.9              | 1.75  | 1.57  | 0.55  | 0.16  | 0.04 | 0.02  |       |       |       |       |       |       |       |       |       |            | 4.09  |
| 4 to 5.9              | 2.28  | 2.92  | 1.48  | 0.53  | 0.13 | 0.02  |       |       |       |       |       |       |       |       |       |            | 7.36  |
| 6 to 7.9              | 2.98  | 4.38  | 2.80  | 1.31  | 0.36 | 0.08  | 0.02  |       |       |       |       |       |       |       |       |            | 11.93 |
| 8 to 9.9              | 3.36  | 5.69  | 4.28  | 2.16  | 0.70 | 0.22  | 0.02  |       |       |       |       |       |       |       |       |            | 16.43 |
| 10 to 11.9            | 3.49  | 6.10  | 5.16  | 2.69  | 1.01 | 0.27  | 0.05  |       |       |       |       |       |       |       |       |            | 18.77 |
| 12 to 13.9            | 2.72  | 5.39  | 4.90  | 2.73  | 1.00 | 0.29  | 0.03  |       |       |       |       |       |       |       |       |            | 17.06 |
| 14 to 15.9            | 1.49  | 3.50  | 3.44  | 2.21  | 0.74 | 0.21  | 0.02  |       |       |       |       |       |       |       |       |            | 11.61 |
| 16 to 17.9            | 0.67  | 1.69  | 1.77  | 1.10  | 0.34 | 0.09  | 0.01  |       |       |       |       |       |       |       |       |            | 5.67  |
| 18 to 19.9            | 0.22  | 0.66  | 0.61  | 0.30  | 0.11 | 0.02  |       |       |       |       |       |       |       |       |       |            | 1.92  |
| 20 to 21.9            | 0.10  | 0.19  | 0.22  | 0.12  | 0.04 | 0.01  |       |       |       |       |       |       |       |       |       |            | 0.68  |
| 22 to 23.9            | 0.05  | 0.10  | 0.10  | 0.04  | 0.02 |       |       |       |       |       |       |       |       |       |       |            | 0.31  |
| 24 to 25.9            | 0.01  | 0.03  | 0.06  | 0.02  | 0.01 |       |       |       |       |       |       |       |       |       |       |            | 0.13  |
| 26 to 27.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 28 to 29.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 30 to 31.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 32 to 33.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 34 to 35.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| 36 to 37.9            |   |       |       |       |      |       |       |       |       |       |       |       |       |       |       |            |       |
| All temps             | 22.10   | 32.98 | 25.58 | 13.40 | 4.51 | 1.24  | 0.15  |       |       |       |       |       |       |       |       |            | 99.96 |

*Table continues*

