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**Supplementary information**

## To what extent can a grade II\* listed building be converted into energy-efficient eco-home?

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**Table 1.5** Recommended comfort criteria for specific applications

| Building/room type                              | Customary winter operative temperatures for stated activity and clothing levels* |                |                | Customary summer operative temperatures (air conditioned buildings†) for stated activity and clothing levels* |                |                | Suggested air supply rate / (L·s <sup>-1</sup> per person unless stated otherwise) | Filtration grade‡              | Maintained illuminance¶ / lux | Noise criterion§     |       |       |
|---|--|----------------|----------------|---|----------------|----------------|--|--------------------------------|-------------------------------|----------------------|-------|-------|
|   | Temp. / °C   | Activity / met | Clothing / clo | Temp. / °C  | Activity / met | Clothing / clo |  |                                |                               | NR                   | dBA§  | dBC§  |
| Airport terminals:                              |  |                |                |   |                |                |  |                                |                               |                      |       |       |
| — baggage reclaim                               | 12–19 <sup>[1]</sup>   | 1.8            | 1.2            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 200                           | 45                   | 50    | 75    |
| — check-in areas <sup>[3]</sup>                 | 18–20  | 1.4            | 1.2            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 500[4]                        | 45                   | 50    | 75    |
| — concourse (no seats)                          | 19–24 <sup>[1]</sup>   | 1.8            | 1.2            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 200                           | 45                   | 50    | 75    |
| — customs area                                  | 18–20  | 1.4            | 1.2            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 500                           | 45                   | 50    | 75    |
| — departure lounge                              | 19–21  | 1.3            | 1.2            | 22–25   | 1.2            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 200                           | 40                   | 45    | 70    |
| Art galleries — see Museums and art galleries   |  |                |                |   |                |                |  |                                |                               |                      |       |       |
| Banks, building societies, post offices:        |  |                |                |   |                |                |  |                                |                               |                      |       |       |
| — counters                                      | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 500                           | 35–40                | 40–45 | 65–70 |
| — public areas                                  | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F5–F7                          | 300                           | 35–45                | 40–45 | 65–70 |
| Bars/lounges                                    | 20–22  | 1.3            | 1.0            | 22–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F5–F7                          | 100–200 <sup>[5]</sup>        | 30–40                | 35–45 | 60–70 |
| Bus/coach stations — see Railway/coach stations |  |                |                |   |                |                |  |                                |                               |                      |       |       |
| Churches  | 19–21  | 1.3            | 1.2            | 22–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | G4–F6                          | 100–200                       | 25–30 <sup>[6]</sup> | 30–35 | 55–60 |
| Computer rooms <sup>[7]</sup>                   | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F7–F9                          | 300                           | 35–45                | 40–50 | 65–75 |
| Conference/board rooms                          | 22–23  | 1.1            | 1.0            | 23–25   | 1.1            | 0.6            | 10 <sup>[2]</sup>  | F6–F7                          | 300/500 <sup>[8]</sup>        | 25–30                | 30–35 | 55–60 |
| Drawing offices                                 | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | F7                             | 750                           | 35–45                | 40–50 | 65–75 |
| Dwellings:                                      |  |                |                |   |                |                |  |                                |                               |                      |       |       |
| — bathrooms                                     | 20–22  | —              | —              | 23–25   | —              | —              | 15 L·s <sup>-1</sup>   | G2–G4 (extract) <sup>[9]</sup> | 150 <sup>[4]</sup>            | —                    | —     | —     |
| — bedrooms                                      | 17–19  | 0.9            | 2.5            | 23–25   | 0.9            | 1.2            | 0.4–1 ACH to control moisture <sup>[9]</sup>                                       | G2–G4                          | 100 <sup>[4]</sup>            | 25                   | 30    | 55    |
| — hall/stairs/landings                          | 19–24 <sup>[1]</sup>   | —              | —              | 21–25 <sup>[1]</sup>  | —              | —              | —  | —                              | 100                           | —                    | —     | —     |
| — kitchen                                       | 17–19  | 1.6            | 1.0            | 21–25   | 1.5            | 0.5            | 60 L·s <sup>-1</sup>   | G2–G4 (extract) <sup>[9]</sup> | 150–300                       | 40–45                | 45–50 | 70–75 |
| — living rooms                                  | 22–23  | 1.1            | 1.0            | 23–25   | 1.1            | 0.6            | 0.4–1 ACH to control moisture <sup>[9]</sup>                                       | G2–G4                          | 50–300                        | 30                   | 35    | 60    |
| — toilets                                       | 19–21  | —              | —              | 21–25   | —              | —              | > 5 ACH  | G2–G4                          | 100 <sup>[4]</sup>            | —                    | —     | —     |
| Educational buildings:                          |  |                |                |   |                |                |  |                                |                               |                      |       |       |
| — corridor                                      | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | — <sup>[17]</sup>              | 100                           | 35–45                | 40–50 | 65–75 |
| — gymnasium                                     | —  | —              | —              | —   | —              | —              | —  | —                              | 300                           | 35–45                | 40–50 | 65–75 |
| — laboratory                                    | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | — <sup>[17]</sup>              | 100                           | 35–40                | 40–45 | 65–70 |
| — lecture halls <sup>[10]</sup>                 | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | G4–G5                          | 500 <sup>[11]</sup>           | 25–30                | 30–40 | 55–65 |
| — seminar rooms                                 | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | G4–G5                          | 300 <sup>[11]</sup>           | 25–35                | 30–40 | 55–65 |
| — teaching spaces <sup>[10]</sup>               | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | G4–G5                          | 300 <sup>[11]</sup>           | 25–35                | 30–49 | 55–65 |
| — workshop                                      | 16–19  | 1.8            | 0.9            | — <sup>[13]</sup>   | —              | —              | — <sup>[14]</sup>  | Depends on use                 | — <sup>[15,16]</sup>          | 35–40                | 40–45 | 65–70 |
| Exhibition halls                                | 19–21  | 1.4            | 1.0            | 21–25   | 1.3            | 0.6            | 10 <sup>[2]</sup>  | G3–G4                          | 300                           | 40                   | 45    | 60    |

*Table continues*

**Figure S1.** An extract of Table 1.5 from CIBSE Guide A (The Chartered Institution of Building Services Engineers, 2021).