Example PAMDOC

These tables represent a Documented Performance Assessment Method (PAMDOC) record for the peak summer temperature example given in CIBSE Guide A, Appendix 5.A6.2.

The aim of a PAMDOC is to outline a procedure by which a performance assessment is performed, inputs and outputs recorded, and quality assurance checks made. In this way a higher quality of assessment should be achieved with much reduced scope for errors.

PAMDOCs are based on the publications produced by the International Energy Agency (IEA) Annex 21, Subtask B (*Calculation of Energy and Environmental Performance of Buildings – Appropriate Use of Programs*).

A blank template of this PAMDOC is available on the CIBSE website (http://www.cibse.org/Knowledge/CIBSE-Guide/CIBSE-Guide-A-Environmental-Design). This version includes full linking between the PAMDOC items and the inputs into the calculation.

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| 0 | PAM Identification |
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|  | Identifier | CIBSE002 |
|  | Purpose | Calculation of summertime temperatures using the CIBSE cyclic method |
|  | Application | Any single space |
|  | Program | Spreadsheet ID 1234 |
|  | Date | 15/11/2014 |
|  | Author | CIBSE |
|  | Address of author | CIBSE, Balham |

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| 1 | Definition of performance assessment |
|  |  |  |
| 1.1 | Purpose | To calculate summertime temperatures in a space using the CIBSE simple dynamic model given in CIBSE Guide A, section 5.10.5 |
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| 1.2 | Applicability |  |
| 1.2.1 | Building type | Residential; non-residential |
| 1.2.2 | Environmental Control Systems | Natural ventilation, mechanical ventilation |
| 1.2.3 | Climate zone | Any |
| 1.2.4 | Program | Spreadsheet |
| 1.2.5 | Resources | CIBSE Guide A, section 5.10.5 (source of method). |
| 1.2.6 | Further information |  |

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| 2 | Procedure |  |
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| 2.1 | Procedure |  |
| 2.1.1 | Define information required | See section 3.1 |
| 2.1.2 | Describe project | See section 5.1 |
| 2.1.3 | Describe site and climate | Set site parameters – Section 5.2 |
| 2.1.4 | Describe zoning procedure | This method is for a single zone. |
| 2.1.5 | Describe building | Input zone geometry – Section 7.1 |
| 2.1.5.1 | Define constructions | Set up opaque constructions (including surface properties) – Sections 7.2 to 7.3 |
|   |   | Set up transparent constructions (including surface properties) – Sections 7.4 |
| 2.1.6 | Describe building operation | Set up occupancy – Section 8.2 |
|   |   | Set up small power – Section 8.3 |
|   |   | Set up lighting – 8.4 |
| 2.1.7 | Describe ventilation process | Set up ventilation rate and profile – Section 8.1 |
| 2.1.8 | Obtain results | As set out in section 3.1 |
| 2.1.9 | Process output data | As set out in Section 3.2 |
| 2.1.10 | Interpret information | As set out in Section 3.4 |
| 2.1.11 | Quality assurance | NA |
| 2.1.12 | Further information | NA |

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| 3 | Information definition |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 3.1 | Information required from the performance assessment |  |  |  |  |  |  |  |  |  |
| 3.1.1 | Description | The purpose of this analysis is to predict the temperature in the space under peak summertime conditions. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 3.1.2 | Results required |  | 3.1.3 | 3.1.4 | 3.1.5 | 3.1.6. | 3.1.7 |
|  | Name | Symbol | Units | Definition | Values | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Response factor | $$f\_{r}$$ | Dimensionless | Characteristic of room response to changes in environmental temperature (an intermediate result) |  | Calculated from Guide A equation 5.14 | Used to quantify the response of the space, which is then used to select the surface factor and delay for each construction (see table 5.6). | CIBSE Guide A Appendix A5.7.1 | Check that the calculated response factor is as expected for the type of construction. For heavyweight buildings a value >4 would be expected. |   |
|  | Peak internal operative temperature |  $$\hat{θ}\_{C}$$ | °C | The sum of the predicted mean internal operative temperature and the swing in internal operative temperature. |  | Calculated as described in Guide A section 5.10.5 | The peak internal operative temperature is the predicted highest temperature reached in the space. | CIBSE Guide Guide A section 5.10.5 | Compare result with the outside temperature and if possible compare to temperatures recorded in similar buildings. |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 3.2 | Post processing of output |  |  |  |  |  |  |  |  |  |
| 3.2.1 | Description | Peak operative temperature is used to assess the design performance against the requirements agreed with the client for the threshold internal temperature or comparing impact of different design options on internal temperatures. |  |  |  |  |  |  |
| 3.2.2 | Program outputs | As 3.1.2 |  |  |  |  |  |  |
| 3.2.3 | Process outputs | N/A |  |  |  |  |  |  |
| 3.2.4 | Rationale |   |  |  |  |  |  |  |
| 3.2.5 | References | For guidance on assessing peak allowable temperatures see CIBSE Guide A, chapter 2 |  |  |  |  |  |  |
|   |   | For information relating to the calculation see CIBSE Guide A, section 5.10.5 |  |  |  |  |  |  |
| 3.2.6 | Quality assurance | See 3.1.6. Additionally, when results are outside the expected range and input has been checked and fine, then run sensitivity analysis on important input parameters to identify recommended measures. |  |  |  |  |  |  |
| 3.2.7 | Further information | N/A |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 3.3 | Form of presentation |  |  |  |  |  |  |  |  |  |
| 3.3.1 | Description |   |  |  |  |  |  |  |
| 3.3.2 | Results required |  | 3.3.3 | 3.3.4 | 3.3.5 | 3.3.6. | 3.1.7 |
|  | Name | Presentation | Values | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Response factor | State the calculated value |  | As 3.1.3 | As 3.1.4 |   |   |   |
|  | Peak internal operative temperature | State the calculated value with units |  | As 3.1.3 | As 3.1.4 |   |   |   |
|  | Calculation version |   |   | Version number for the assessment. | Iteration number for the assessment to allow changes to be tracked. |   | Ensure sequential numbering is maintained. |   |
|  | Date | Date of analysis |   | Date the assessment was performed |   |   |   |   |
|  | Checked | Person responsible for checking the assessment. |   | Name of the person responsible for checking the assessment |   |   |   |   |
|  | Approval | Person responsible for approving the assessment. |   | Name of the person responsible for approving the assessment for issue |   |   |   |   |

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| 4 | Configuration |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 4.1 | Program version |  |  |  |  |  |  |  |  |
| 4.1.1 | Title | CIBSE cyclic method spreadsheet |  |  |  |  |  |  |
| 4.1.2 | Program author | CIBSE |  |  |  |  |  |  |
| 4.1.3 | Vendor | Internal |  |  |  |  |  |  |
| 4.1.4 | Version number | 1 |  |  |  |  |  |  |
| 4.1.5 | Date of release | 17/11/2014 |  |  |  |  |  |  |
| 4.1.6 | Quality assurance | Checks should be made against the examples given in CIBSE Guide A chapter 5. |  |  |  |  |  |  |
| 4.1.7 | Further information | N/A |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 4.2 | User sub model selection |  |  |  |  |  |  |  |  |
| 4.2.1 | Sub model 1 |   |  |  |  |  |  |  |
| 4.2.1.1 | Description | No sub models used for this PAM |  |  |  |  |  |  |
| 4.2.1.2 | Name |   |  |  |  |  |  |  |
| 4.2.1.3 | Select sub model method |   |  |  |  |  |  |  |
| 4.2.1.4 | Rationale |   |  |  |  |  |  |  |
| 4.2.1.5 | Reference |   |  |  |  |  |  |  |
| 4.2.1.6 | Quality assurance |   |  |  |  |  |  |  |
| 4.2.1.7 | Further information |   |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |
| 4.3 | User selected computational parameters |  |  |  |  |  |  |  |  |  |
| 4.3.1 | Computational parameters |   |  |  |  |  |  |  |  |  |
| 4.3.1.1 | Description | No computational parameters used in this PAM |  |  |  |  |  |  |
| 4.3.1.2 | Computational parameters |  | 4.3.1.3 | 4.3.1.4 | 4.3.1.5 | 4.3.1.6 | 4.3.1.7 |
|  | Name | Symbol | Units | Definition | Values | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  |   |   |   |   |   |   |   |   |   |   |
|  |   |   |   |   |   |   |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 4.3 | User selected initial conditions |  |  |  |  |  |  |  |  |  |
| 4.3.1 | Initial conditions |   |  |  |  |  |  |  |  |  |
| 4.3.1.1 | Description | No user selected initial conditions used in this PAM |  |  |  |  |  |  |
| 4.3.1.2 | Initial conditions |  | 4.3.1.3 | 4.3.1.4 | 4.3.1.5 | 4.3.1.6 | 4.3.1.7 |
|  | Name | Symbol | Units | Definition | Values | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  |   |   |   |   |   |   |   |   |   |   |
|  |   |   |   |   |   |   |   |   |   |   |

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| 5 | Context description |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 5.1 | Project details |  |  |  |  |  |  |  |  |  |
| 5.1.1 | Description |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 5.1.2 | Parameter definition list |  | 5.1.3 | 5.1.4 | 5.1.5 | 5.1.6 | 5.1.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | User | NA | NA | Name of engineer performing the assessment | A N Other |   |   |   |   |   |
|  | Project name | NA | NA | Name of project | Guide A chapter 5 peak summertime temperature example | Name of main project (including job number if available). |   |   |   |   |
|  | Task description | NA | NA | Description of task | Produce a prediction for the peak summertime temperature for the test cell in Example 5.A6.2. | Description of the specific assessment. |   |   |   |   |
|  | Date | NA | NA | Date of assessment | 05/11/2013 |   |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 5.2 | Site description |  |  |  |  |  |  |  |  |  |
| 5.2.1 | Location |  |  |  |  |  |  |  |  |  |
| 5.2.1.1 | Description | The geographical location of the building |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 5.2.1.2 | Parameter definition list |  | 5.2.1.3 | 5.2.1.4 | 5.2.1.5 | 5.2.1.6 | 5.2.1.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Location | NA | NA | The location of the building | Manchester | Select from the locations available in Guide A, chapter 2. | The selection of climate data is related to the location of the building. Deviation from the data given in Guide A chapter 2 for the location should be justified. | Guide A Table 2.1 |   |   |
|  | Latitude | NA | ° | Degree of latitude, indicate North or South hemisphere | NA | Set these values to those for the location of the actual building. | Climate data is regional hence this parameter is not useable |   |   |   |
|  | Longitude | NA | ° | Degree of longitude, positive for East, negative for West |  NA | Set these values to those for the location of the actual building. | Climate data is regional hence this parameter is not useable |   | Check that the hemisphere (North or South) and Westing/Easting is correct. |   |
|  | Altitude | NA | m | Height of site above sea level. |  NA | Set these values to those for the location of the actual building. | Climate data is regional hence this parameter is not useable |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 5.3 | Climate description |  |  |  |  |  |  |  |  |  |
| 5.3.1 | Description | The climate data used by the program to predict summertime temperatures. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 5.3.2 | Parameter definition list |  | 5.3.3 | 5.3.4 | 5.3.5 | 5.3.6 | 5.3.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Expected month of peak temperature |   |   | Month in which the peak internal operative temperature is expected to occur. | NA | This will not be needed because all summer months should be assessed (April to September). | The peak summer temperature can occur as a result of high outside temperature, high internal gains or high solar gain and these will not always coincide in the same month. |   |  | CIBSE Guide A2 for climatic data |
|  | Mean total solar irradiance | $$\overbar{I}\_{T}$$

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 | W∙m-2 | The mean solar irradiance for the relevant façade orientation and month. |   | Select the appropriate value from CIBSE Guide A, chapter 2, Table 2.13(h). Value should be taken as the beam + diffuse. | Used to calculate the swing in solar gain to the space. | CIBSE Guide A, Table 2.13(h) | Ensure the correct location and orientation are used. | CIBSE Guide A chapter 5 for description of method. |
|  | Peak solar irradiance |  $$\hat{I}\_{T}$$ | W∙m-2 | The peak solar irradiance for the relevant façade orientation and month. |   | Find the peak (beam + diffuse) for the surface orientation from CIBSE Guide A, Table 2.13(h). | Used to calculate the mean glazing fabric and ventilation gains to the space. | CIBSE Guide A, Table 2.13(h) | Ensure the correct location and orientation are used. |   |
|  | Time of peak solar irradiance |  $$t\_{\hat{I}\_{T}}$$ |   | The time that the peak solar irradiance for the relevant façade orientation and month occurs. |   | Note the time at which the peak solar irradiance (beam + diffuse) occurs. | Used to calculate the mean fabric gains via the opaque surfaces. | CIBSE Guide A, Table 2.13(h) | Ensure the correct location and orientation are used. |   |
|  | Mean air temperature |  $$\overbar{θ}\_{ao}$$ | °C | Mean air temperature for the month |   | Note the mean air temperature for the month of interest from CIBSE Guide A, Table 2.14(h). | Used to calculate the swing in fabric gains via opaque surfaces. | CIBSE Guide A, Table 2.14(h) | Ensure the correct location and orientation are used. |   |
|  | Mean sol air temperature |  $$\overbar{θ}\_{eo}$$ | °C | Mean sol-air temperature for the relevant façade orientation and month. |   | Note the mean sol-air temperature for the orientation and month of interest from CIBSE Guide A, Table 2.14(h). |   | CIBSE Guide A, Table 2.14(h) | Ensure the correct location and orientation are used. |   |
|  | Sol-air temperature at time  |   | °C | Sol-air temperature for each external surface at time for that surface |   | Note temperature at time [?] + SHD [WHAT IS THIS?] from CIBSE Guide A, Table 2.14(h).$$ϕ$$ | Used to calculate the swing in glazing fabric gains and in the ventilation gains. | CIBSE Guide A, Table 2.14(h) | Ensure the correct location and orientation are used. |   |
|  | External air temperature at time |   | °C | Air temperature for hour of interest. |   | Air temperature at time for that surface. See 7.2.1 for definition of WHAT? |   | CIBSE Guide A, Table 2.14(h) | Ensure the correct location and orientation are used. |   |

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| 6 | Zoning | This is a single zone model and so this section is unused |
|  |  |  |
| 6.1 | Zone description |  |
| 6.1.1 | Modelled zones |  |
| 6.1.1.1 | Description |   |
| 6.1.1.2 | Parameter definition list |   |
| 6.1.1.3 | Define zone |   |
| 6.1.1.4 | Rationale |   |
| 6.1.1.5 | Reference |   |
| 6.1.1.6 | Quality assurance |   |
| 6.1.1.7 | Further information |   |
|  |  |  |
| 6.1.2 | Adjacent unmodelled zones |  |
| 6.1.2.1 | Description |   |
| 6.1.2.2 | Parameter definition list |   |
| 6.1.2.3 | Define zone |   |
| 6.1.2.4 | Rationale |   |
| 6.1.2.5 | Reference |   |
| 6.1.2.6 | Quality assurance |   |
| 6.1.2.7 | Further information |   |
|  |  |  |
| 6.2 | Interzonal coupling |  |
| 6.2.1 | Interzonal coupling - airflow |  |
| 6.2.1.1 | Description |   |
| 6.2.1.2 | Parameter definition list |   |
| 6.2.1.3 | Define zone |   |
| 6.2.1.4 | Rationale |   |
| 6.2.1.5 | Reference |   |
| 6.2.1.6 | Quality assurance |   |
| 6.2.1.7 | Further information |   |
|  |  |  |
| 6.2.2 | Interzonal coupling - shortwave |  |
| 6.2.2.1 | Description |   |
| 6.2.2.2 | Parameter definition list |   |
| 6.2.2.3 | Define zone |   |
| 6.2.2.4 | Rationale |   |
| 6.2.2.5 | Reference |   |
| 6.2.2.6 | Quality assurance |   |
| 6.2.2.7 | Further information |   |

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| 7 | Building description |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.1 | Geometry |  |  |  |  |  |  |  |  |  |
| 7.1.1 | Description |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.1.2 | Parameter definition list |  | 7.1.3 | 7.1.4 | 7.1.5 | 7.1.6 | 7.1.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Surface area | An | m2 | The area of surface n |  | Use external surface area. |   |   |   |   |
|  | Wall orientation |   |   | The orientation of surface n |  | Round to nearest of N, NW, W, SW, S, SE, E, NW. | Data for solar irradiation is given only for these orientations |   |   |   |
|  | Wall glazed area | Ag | m2 | Area of glazing on surface n |  | Input area of glazing plus frame. |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.2 | Constructions |  |  |  |  |  |  |  |  |  |
| 7.2.1 | Opaque (not glazing) |  |  |  |  |  |  |  |  |  |
| 7.2.1.1 | Description |   |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.2.1.2 | Parameter definition list |  | 7.2.1.3 | 7.2.1.4 | 7.2.1.5 | 7.2.1.6 | 7.2.1.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Construction name |   |   | Name of the construction |  |   |   | CIBSE Guide A, Tables A3.48 to 3.54 give the required figures for a number of constructions. |   |   |
|  | Thermal transmittance (U-value) | U | W m-2 K-1 | The U-value of the construction. |  | Input the U-value for the particular construction. | Take figures from CIBSE Guide A Tables 3.48-3.54 or calculate according to CIBSE Guide A, sections 3.3.10 and 3.3.11. | CIBSE Guide A Appendix 3.A6 gives the calculations for admittance, decrement factor and surface factor. | Check against examples in CIBSE Guide A Tables A3.48-A3.54 that value is realistic. |   |
|  | Admittance | Y | W m-2 K-1 | The Y value of the construction. |  | Input the Y-value for the particular construction. | Take figures from CIBSE Guide A Tables 3.48-3.54 or calculate according to Appendix 3.A6 | CIBSE Guide A, section 3.9.1.1 | Check against examples in CIBSE Guide A Tables A3.48-A3.54 that value is realistic. |   |
|  | Decrement factor | f |   | The decrement factor for the construction. |  | Input the decrement factor for the particular construction. | Take figures from CIBSE Guide A Tables 3.48-3.54 or calculate according to Appendix 3.A6 | CIBSE Guide A, section 3.9.1.1 |   |   |
|  | Time lag | $$ϕ$$ | Hours | The time lag for the construction. |  | Input the time lag for the particular construction. | Take figures from CIBSE Guide Tables 3.48-3.54 or calculate according to Appendix 3.A6 | CIBSE Guide A, section 3.9.1.1 |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.3 | Surface properties (external elements) |  |  |  |  |  |  |  |  |  |
| 7.3.1 | Surface finish |  |  |  |  |  |  |  |  |  |
| 7.3.1.1 | Description | The surface description used in the selection of the correct sol air temperature. |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.3.1.2 | Parameter definition list |  | 7.3.1.3 | 7.3.1.4 | 7.3.1.5 | 7.3.1.6 | 7.3.1.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Surface colour |   |   | The characteristic of the surface finish, either dark or light |  | The data table is based on an absorptance of 0.5 for light surfaces and 0.9 for dark. Generally any surface finish other than gloss finish or satin/polished metal would be dark. | The surface finish will determine the amount of solar radiation absorbed and hence the sol-air temperature. | CIBSE Guide A section 2.8.5 | Unless cleaned a light surface can become dark. If this is likely to be the case the sensitivity to this change should be determined. |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.4 | Window properties |  |  |  |  |  |  |  |  |  |
| 7.4.1 | Glazing |  |  |  |  |  |  |  |  |  |
| 7.4.1.1 | Description | Glazing constructions |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 7.4.1.2 | Parameter definition list |  | 7.4.1.3 | 7.4.1.4 | 7.4.1.5 | 7.4.1.6 | 7.4.1.7 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Glazing type |   |   |   |   |   |   |   |   |   |
|  | Mean solar gain factor at environmental node | $$\overbar{S}\_{e}$$

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 |   | Factor relating mean solar radiation with the mean solar gain to the environmental node for the glazing type. |   | Read value from Guide A Figure 5.30 (slow)  |   |   |   |   |
|  | Mean solar gain factor at air node |  $$\overbar{S}\_{a}$$ |   | Factor relating mean solar radiation with the mean solar gain to the air node for the glazing type. |   | Read value from Guide A Figure 5.30 (slow) |   |   |   |   |
|  | Alternating solar gain factor at environmental node |  $$\~S\_{e}$$ |   | Factor relating instantaneous solar radiation with the instantaneous solar gain to the environmental node for the glazing type. |   | Read value from Guide A Figure 5.30 (slow) |   |   |   |   |
|  | Alternating solar gain factor at air node |  $$\~S\_{a}$$ |   | Factor relating instantaneous solar radiation with the instantaneous solar gain to the air node for the glazing type. |   | Read value from Guide A Figure 5.30 (slow) |   |   |   |   |
|  | Frame percentage | %frame |   | The percentage of the frame for the glazing. |   |   |   |   |   |   |

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| 8 | Building operation description |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| 8.1 | Ventilation |  |  |  |  |  |  |  |  |  |
| 8.1.1 | Description | The ventilation rate in the space. |  |  |  |  |  |  |
| 8.1.2 | Parameter definition list |  | 8.1.3 | 8.1.4 | 8.1.5 | 8.1.6 | 8.1.8 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Ventilation rate | N | Air changes per hour | The ventilation rate of outside air |  | The value should represent the effective ventilation rate in the space. CIBSE Guide A Table 5.21 gives values for various ventilation configurations. |   | CIBSE Guide A Table 5.21. | Check for excessive air change rate values which may disturb occupants and start papers flying | CIBSE Guide A chapter 4 deals with ventilation in general. |
|  |  |  |  |  |  |  |  |  |  |  |
| 8.2 | Occupancy |  |  |  |  |  |  |  |  |  |
| 8.2.1 | Description | Heat gains from occupants |  |  |  |  |  |  |
| 8.2.2 | Parameter definition list |  | 8.2.3 | 8.2.4 | 8.2.5 | 8.2.6 | 8.2.8 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Occupancy level |   |   | Effective number of occupants in space |  |   |   |   |   |   |
|  | Sensible heat output |   | W/person | The sensible heat output from each occupant. |  |   |   | CIBSE Guide A Table 6.3 gives heat outputs for human metabolism. |   |   |
|  | Hours gain present |   | Hours | The number of hours in total the occupants are present. |  | This should be summed on an hourly basis, partial occupancy i.e. less than 100% should be taken in to account. |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 8.3 | Equipment |  |  |  |  |  |  |  |  |  |
| 8.3.1 | Description | Heat gain levels from equipment |  |  |  |  |  |  |
| 8.3.2 | Parameter definition list |  | 8.3.3 | 8.3.4 | 8.3.5 | 8.3.6 | 8.3.8 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Magnitude of gain |   |   | The maximum level of equipment gain. |  |   |   | CIBSE Guide A Table 6.6 gives example gains for various items of office equipment. |   |   |
|  | Hours gain present |   |   | The number of hours the equipment gain is present. |  |   |   |   |   |   |
|  |  |  |  |  |  |  |  |  |  |  |
| 8.4 | Lighting |  |  |  |  |  |  |  |  |  |
| 8.4.1 | Description | Heat gains due to lighting |  |  |  |  |  |  |
| 8.4.2 | Parameter definition list |  | 8.4.3 | 8.4.4 | 8.4.5 | 8.4.6 | 8.4.8 |
|  | Name | Symbol | Unit | Definition | Value | Rules for assignment of values | Rationale | References | Quality assurance | Further information |
|  | Magnitude of gain: |   | W m-2 | The maximum level of lighting gain. |  |   |   | CIBSE Guide Table A6.4 gives example lighting heat gains. |   |   |
|  | Hours gain present: |   | Hours | The number of hours the lighting gain is present. |  | This should be summed on an hourly basis, partial levels i.e. less than 100% should be taken in to account. |   |   |   |   |