

## Daylight Factors

Where no values are given for  $\tau$ , GBC and MF, assume values of 0.85, 0.8 and 0.8.

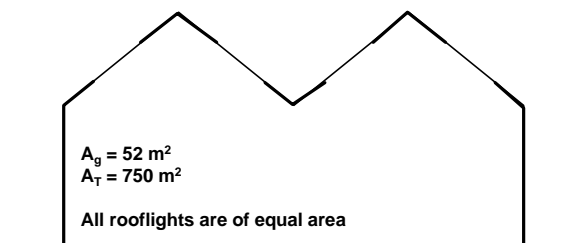
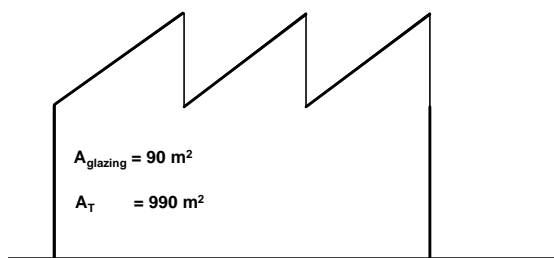
- 1 A room is 6m deep by 4m wide by 3m high. There is a single window in the room which is centrally placed along one side of the room and is 3m wide with a head height of 2.2m and a cill height of 0.8m. External to the window is a long obstruction 3.6m high. and 10m distant which runs parallel to the window wall. The ceiling walls and floor are respectively of reflectance 0.7, 0.4 and 0.15.

Calculate the average daylight factor using equations 10,13 and 14.

[ 1. 4%, 2. 0%, 2. 5% ]

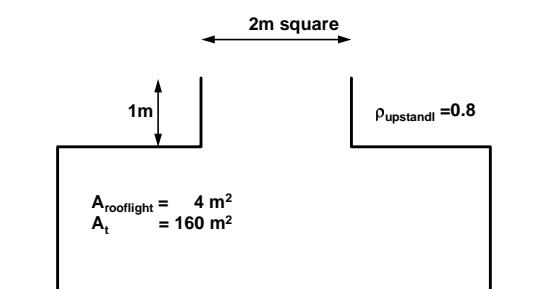
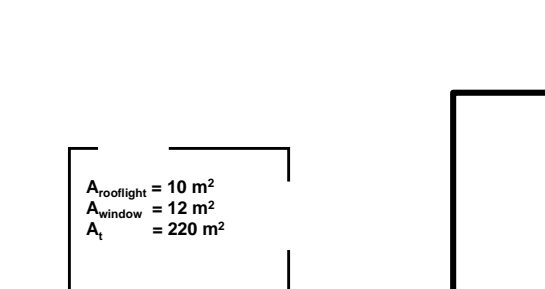
- 2 Use the figure showing daylight levels at different times in the year to plot a graph of the proportion of working hours for which levels of diffuse daylight are exceeded. Assume the working year is from 8-45am until 5-15pm .  
 [ 95% > 1000 lx , 87% > 5 000 lx, 71% > 10 000 lx, 56% > 15 000 lx, 40% > 20 000 lx, 12% > 30 000 lx, 5% > 32 500 lx ]  
 Repeat the exercise for a working year more suited to recreational activities such as from 10am to 10pm.  
 [ 71% > 1000 lx , 61% > 5 000 lx, 51% > 10 000 lx, 39% > 15 000 lx, 26% > 20 000 lx, 8% > 30 000 lx, 3% > 32 500 lx ]

- 3 Calculate the average daylight factor in the following examples if it is assumed that the average reflectance of the rooms' surfaces is 0.35. Use a protractor to determine angles.  
 [ 3%, 3. 8%



]

- 4 Calculate the average daylight factor in the following examples if it is assumed that the average reflectance of the room surfaces is 0.3. Also assume that the reflectance of external surfaces is 0.15. In the second example initially ignore the light reflected within the light well, then add that which is reflected from the walls of the light well.

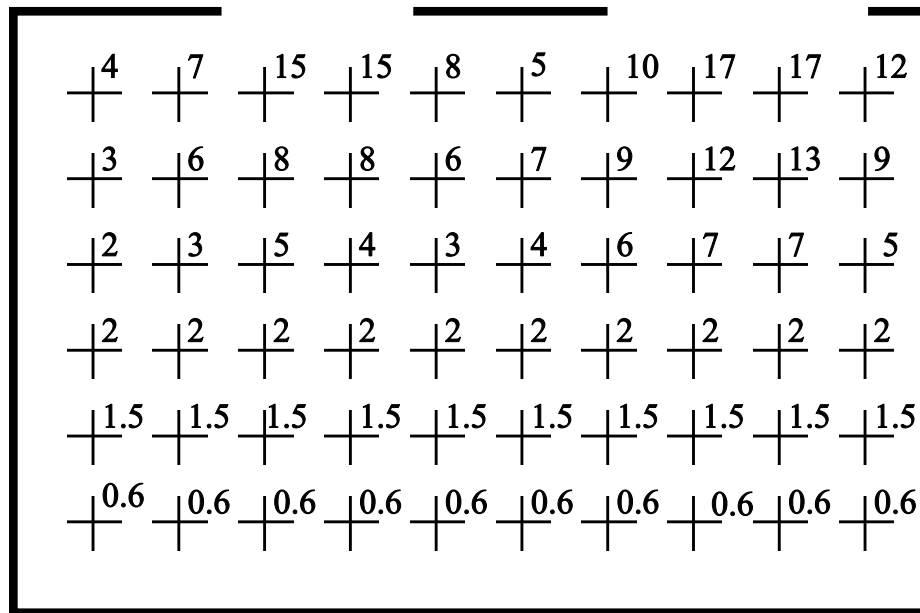


4. 5%, 1. 5% ]

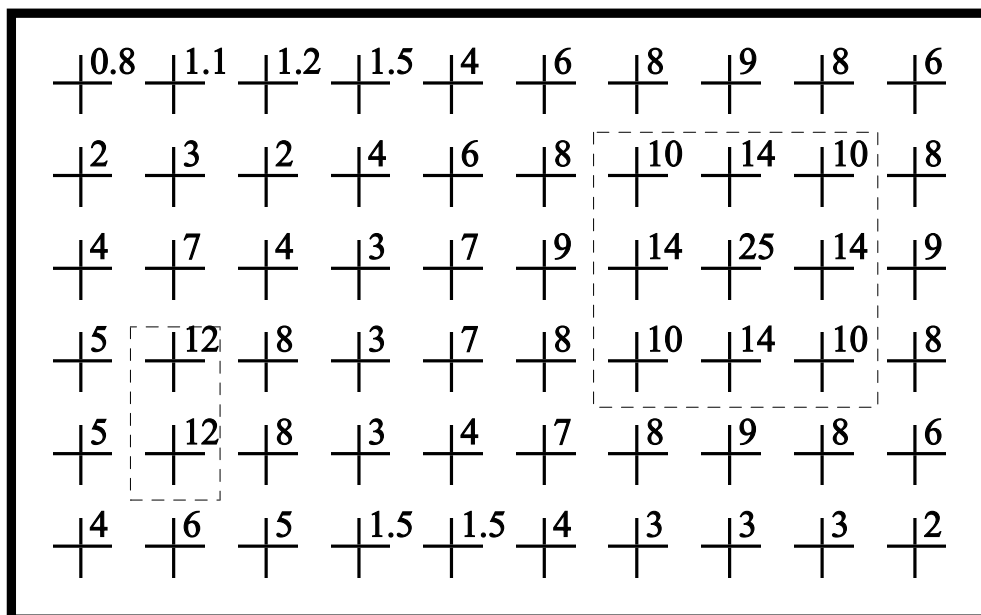
- 5 If a room is to be lit to at least 300 lx, estimate the number of hours of electric lighting will be used during the working year if the average daylight factor in the room is 2%. Assume the electric lighting is on whenever daylight provides on average illuminance less than 300 lx , that a working year is 2142 hrs and that the maximum sky illuminance is 34 000 lx..

[ 386 hrs ]

- 6 Draw daylight factor contours on the daylight factor grids shown in the following two examples, a sidelit room and a rooflit room.



**Plan of room with % daylight factors on a grid**



**Two rooflights - shown in plan by convention as broken lines and % daylight factors shown on a grid**