

AECB Daylight Assessment



AECB Daylight Standard

This standard is part of a suite of additional AECB standards that complement the main AECB Building Standard, these are:

- AECB Building Standard
 - o AECB Lifetime Carbon Standard
 - o AECB Daylighting Standard
 - o AECB Water Efficiency Standard

Creating a well-lit building is vital for the well-being of people using a building as well as for reducing energy demand and carbon emissions. Whilst recognising that the amount of daylight available within a building is constrained by the amount of useful daylight outside, the aim of the AECB Daylight Standard is to provide adequate daylight between 9am and 5pm for 70% of the year and acceptable daylight 80% of the year between 10am and 2pm. To satisfy these criteria the AECB Daylight Standard requires you to assess the quality of daylight within each habitable room. The AECB Daylight Assessment is used to verify that a design meets this standard.

AECB Daylight Assessment

To determine the quality of daylight you must evaluate how evenly daylight is distributed within a room (the Daylight Uniformity), and the proportion of daylight within the room relative to outdoor conditions (the Daylight Factor).

Satisfactory Daylight Uniformity is achieved when more the 80% of a habitable room receives natural daylight. Acceptable daylighting is achieved when the specified Daylight Factor is achieved (refer to Appendix 1 for Daylight Factor criteria). To reduce the risk of overheating high daylight factors (oversized windows) should be avoided. Daylight Uniformity and the Daylight Factor must be calculated in accordance with BS 8206-2 using the AECB Daylight Calculator.

About the AECB Daylight Calculator

The AECB Daylight Calculator allows you to evaluate Daylight Uniformity and the Daylight Factor within each habitable room.

Based upon BS 8206-2, and informed by BRE BR209, BRE IP 15/88 and BRE Digest 309, the AECB Daylight Calculator is a simple but powerful series of worksheets that make daylight assessment quick and easy.

The calculator is ideal for buildings that aspire to the AECB Building Standard or the Passivhaus Standard because has been optimised to make use of the normal PHPP workflow - saving time and effort. (If you are not a PHPP user don't worry, you can still complete a conventional daylighting assessment.)

The screenshot shows the AECB Daylight Calculator interface. It includes input fields for Consultant, Street, Postcode/City, Province/Country, Client, and Building details. A table is provided for room assessment with columns for Level (Storey), Room Name, Room Depth, Daylight Uniformity, Daylit Area, Target Area, Design Area, and Daylight Suitability. The table has 10 rows and 8 columns.

Level (Storey)	Room Name	Room Depth	Daylight Uniformity	Daylit Area	Target Area	Design Area	Daylight Suitability
			%	View NoSkyLine % Pass/Fail	%	% Pass/Fail	Summary Pass/Fail

NOTES
1: For the purposes of these calculations, it is assumed that the average daylight factor is the mean daylight factor over a horizontal working plane, unless stated otherwise.
2: Direct and reflected sunlight are excluded from all values of illuminance.
3: No correction is made for window reveals or 'courtyard' type conditions. (Rooms with these conditions will receive less light.)
4: The no-sky line divides those areas of the working plane which can receive direct light from the sky, from those which cannot. Areas beyond the no-sky line will generally look gloomy. Over 50% of the room should be within the no-sky line.

An example of the calculator's simple one-page Verification report is given on the right. A copy of this report should be submitted with your AECB Building Standard documentation.

Submission

Each complimentary AECB standard adopted must be submitted as part of your AECB Building Standard submission and uploaded via the AECB Low Energy Building Database (LEBD). The report summary verifications sheets for each standard must be combined into a single pdf and uploaded as the 'PHPP verification sheet' entry on the LEBD.

You may still submit for the AECB Building Standard only, without any complimentary standards, however we do of course encourage you to adopt as many of these as possible in each project. You may *not* submit complimentary AECB Standards without submitting for the AECB Building Standard or the Passivhaus Standard as a prerequisite. If you want to retrospectively add complementary standards to an *existing* AECB Standard certified project please contact the AECB team via the LEBD. Evidence for the complimentary standards is to follow the standard reporting format provided by the AECB CarbonLite PHribbon software, available from the AECB.

Other Daylight Standards

The AECB Daylight Calculator shares the same calculation procedure as Housing Quality Mark (HQM) and BREEAM. This means you can avoid duplicating effort and use it to assess the quality of daylight under those standards as well.

Appendix 1: Satisfactory Daylight Factors

The table below shows the Daylight Factors required by the AECB Standard and other standards.

Target Daylight Factor				
Room Type	AECB Standard	HQM	BREEAM	BS:8206
** DWELLINGS/MULTI-RES **				
Kitchen	> 2	> 2	> 2	> 2
Utility	> 2			
Living Room	> 1.5	> 1.5, > 1.8, > 2.0	> 2	> 1.5
Dining	> 1.5	> 1.5, > 1.8, > 2.0	> 2	
Study/Office	> 1.5	> 1.5, > 1.8, > 2.0	> 2	
Bedroom	> 1			> 1
Bathroom (guideline only)	> 1			
MULTI-RES: Non-residential spaces	> 2		> 2	
MULTI-RES: Communal occupied spaces	> 2		> 2	
** EDUCATION **				
Preschools	> 2		> 2	
Schools	> 2		> 2	
Further education	> 2		> 2	
Higher education-occupied spaces	> 2		> 2	
** HEALTHCARE **				
Staff and public areas	> 2		> 2	
Occupied patient's areas (dayrooms, wards)	> 3		> 3	
Consulting rooms	> 3		> 3	
** RETAIL **				
Sales areas	-		-	
Other occupied areas	> 2		> 2	
** OTHER BUILDINGS: Courts, Industrial, Office, Prison buildings etc.				
Cells and custody cells	> 1.5		> 1.5	
Internal association or atrium area	> 3		> 3	
Patient care spaces	> 3		> 3	
Teaching, lecture and seminar spaces	> 2		> 2	
All occupied spaces, unless indicated	> 2		> 2	

Appendix 2: Characteristic Illuminance and Daylight Factors

To appreciate the results of the daylight calculations in the context of low energy buildings the table below gives you a guide to appropriate levels of day:

CIBSE Recommended Illuminance (lux)	Equivalent Average Daylight Factor	Likelihood of Overheating from Glazing	Characteristics of activity/space	Representative activities/spaces
1 to 5			Wayfinding, finding objects (such as glasses)	Bedrooms (night-time)
3 to 5			Wayfinding	Circulation areas (night-time)
10			Basic security, demarcation of routes, identifying buildings	Pathways and car parks (night-time)
20 to 30			Basic security, demarcation of routes, identifying buildings	Circulation areas for elderly (night-time)
50	0.5% (all orientations)	Very Low	Projected or backlit visual display	Television areas, media lounge
100	1% (all orientations)	Low	Occasionally visited and confined to movement and casual sight	Bedrooms, corridors and stairs, bathrooms and toilets, changing rooms, stores
150 Task lighting beneficial	1.5% (all orientations)	Low/ Moderate	Occasionally visited and with visual tasks requiring some perception of detail	Living rooms, home-offices, reading, stairs, dining rooms, galley kitchens
200 Task lighting beneficial	2% (all orientations)	Moderate	Visual tasks not requiring any perception of detail	Entrances, kitchens, utility rooms, reading
300 Task lighting recommended	3% (north facing only)	High/ Moderate	Visual tasks are moderately easy i.e. large details, high contrast	Hobby, art and craft, measuring and sawing, background office lighting
400 Task lighting highly recommended	4% (north facing only)	High	Visual tasks are moderately easy i.e. large details, high contrast	Children's classrooms
500 Task lighting required	5% (north facing only)	High/Very High	Visual tasks are moderate difficulty, low contrast, colour judgement may be required	Offices, classrooms, workshops, art and craft, assembly, adult classrooms, snooker rooms
750 Task lighting required	7.5% (north facing only)	Catastrophic	Difficult visual tasks i.e. details are small, of low contrast and accurate colour judgement may be required.	Technical hand drawing
1000 Task lighting required	10% (north facing only)	Catastrophic	Very difficult visual tasks, details extremely small, low contrast.	Jewellery making, electronic assembly
1500 Task lighting required	15% (north facing only)	Catastrophic	Extremely difficult visual tasks, details extremely small, low contrast.	Close inspection of graphic detail, hand tailoring
2000 Task lighting required	20% (north facing only)	Catastrophic	Exceptionally difficult visual tasks, details exceptionally small, very low contrast.	Assembly of minute mechanisms

Table adapted from the CIBSE Code for Lighting (2002), CIBSE Lighting Guide 9: Lighting for communal residential buildings (2013)