

DESIGNING FOR DAYLIGHT

25° & 45° TESTS

From FIRST IN ARCHITECTURE

Good natural lighting is very important in both peoples homes, but also many non domestic buildings. Not only will natural light improve the look and feel of an interior space, it will provide suitable light for work or reading. Good daylighting design can act as an energy efficient factor by reducing the need for electric lighting. There are many reasons to incorporate plenty of natural daylight and sunlight into your design, not to mention the proven benefits to occupants health and wellbeing.

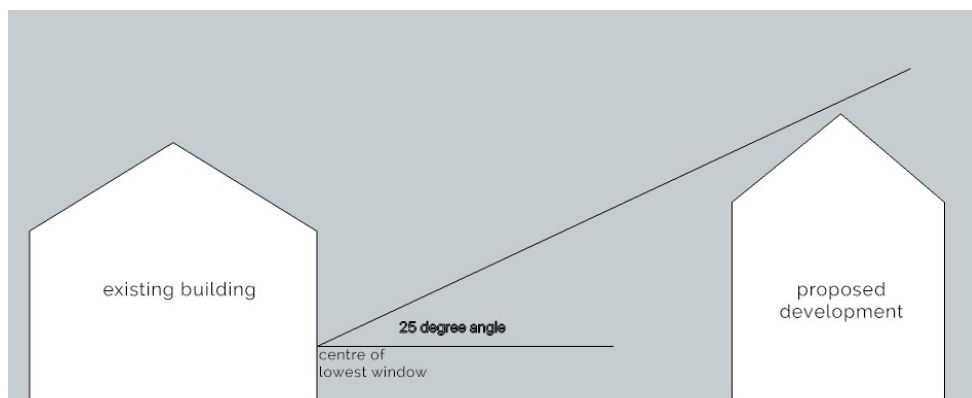
When designing a new scheme, it is important to consider daylight and sunlight. A planning application will not be approved by the local planning authority if the proposal has an adverse effect on day light and sunlight to neighbouring properties. This is a huge topic, and there are guidance documents that can be very useful if you find yourself up against daylight and sun lighting issues. Be sure to seek out the "BRE Site Layout and Planning for Daylight and Sunlight : A Guide to Good Practice (2011)". This document gives two useful rules of thumb to consider prior to submitting your plans to the local authority. These rules of thumb are used by the local authority to decide whether or not there will be an adverse effect to neighbouring properties.

Although these guidelines are useful from a planning point of view, the guidance should be considered best practice at a minimum, to help improve the quality of natural lighting to indoor spaces.

25 degree test

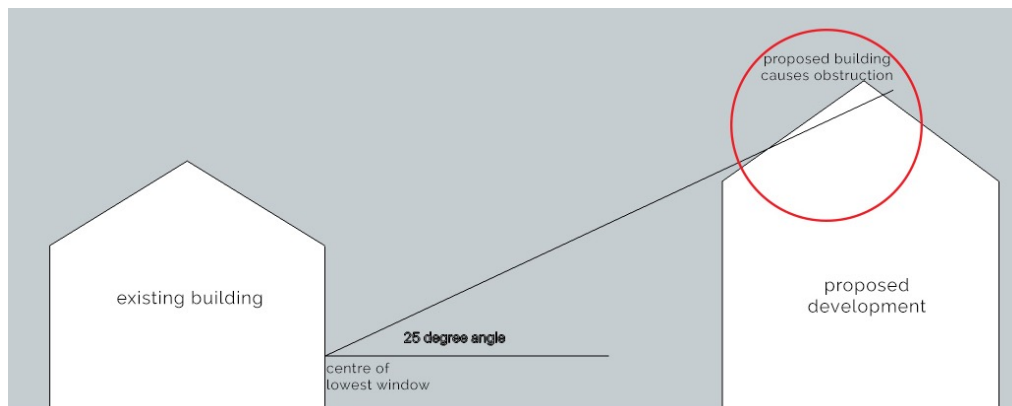
This test is to establish the effect a proposed building will have on existing properties with regards to obstructing daylight to existing windows/rooms. This test is carried out when the proposed building is opposite the existing building.

A reference line is taken at 2m on the existing building. This is the assumed position of the top of windows in the existing building. A 25 degree line is then drawn towards the proposed building. If the whole proposed development falls underneath the line drawn at 25 degrees, there is unlikely to be a detrimental effect to daylight on the existing property.



However, if the proposed building falls above the 25 degree line in any way, it is likely that further tests will be required to establish the exact impact the proposed development would

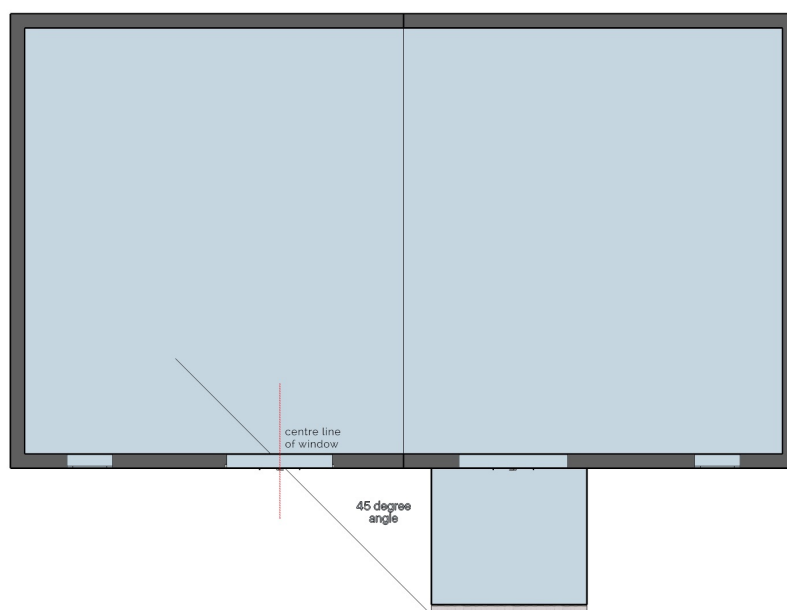
have on daylight to the existing property. If the obstructing building is taller than the 25 degree line, it is still possible to achieve good daylighting, providing the obstruction is not continuous, and it is narrow enough to allow daylight around its sides.

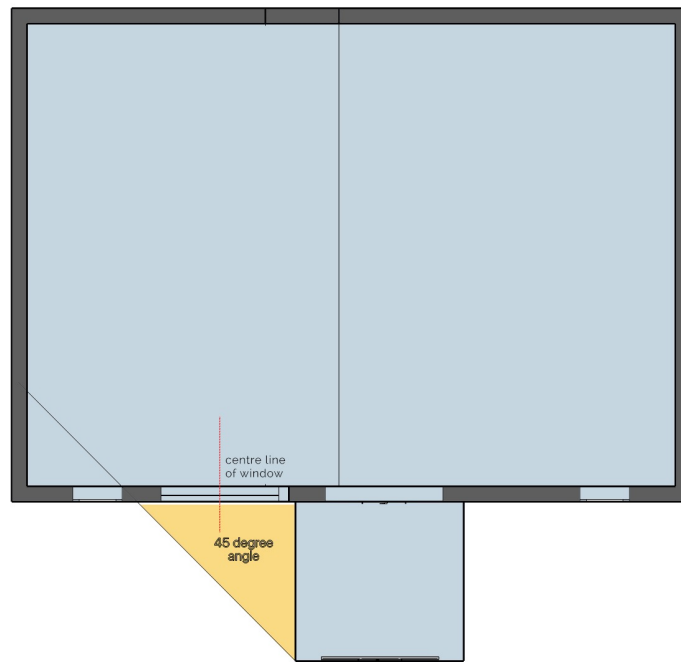


Refer to the BRE Daylight and Sunlight document for further information.

45 degree test in plan

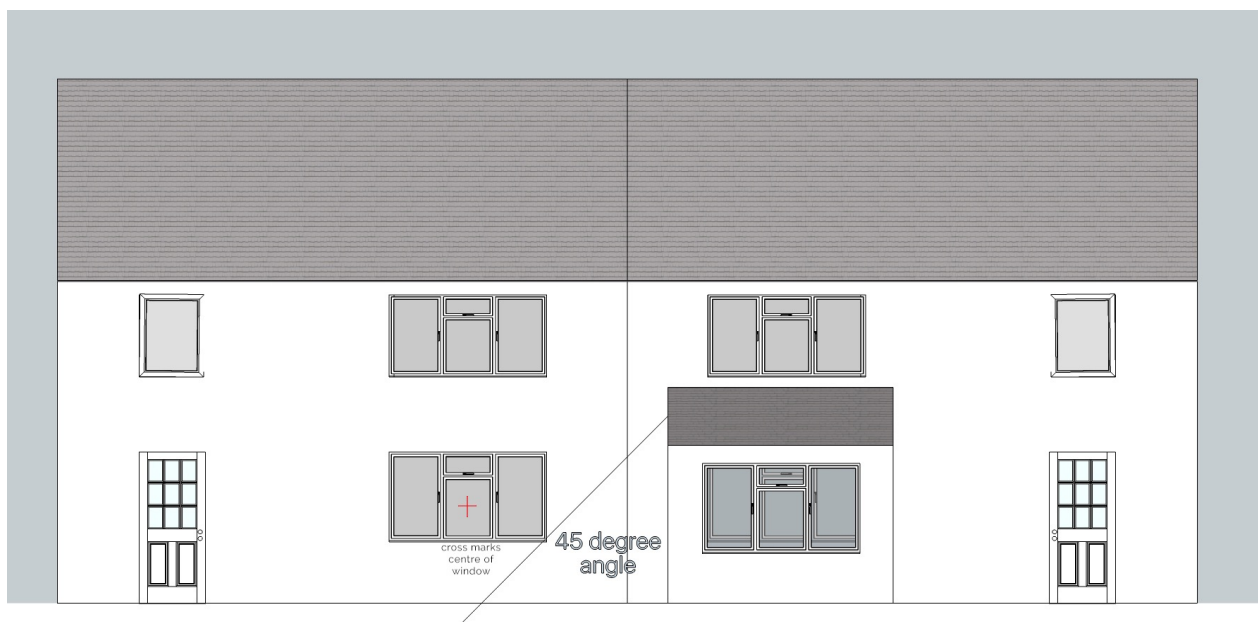
The 45 degree tests work usually for extensions that are perpendicular to a window in a neighbouring property. This test is suited to residential dwellings and also non domestic situations, where occupants have a reasonable expectation of daylight, for example schools, hospitals, hotels, offices and workshops. A centre line is marked on the plan of the neighbouring window that may be affected. A 45 degree angle is drawn from the outer most part of the extension toward the window. (If the neighbouring window is a patio door, or full length window, take a point 2m above ground level on the centre line of the window).

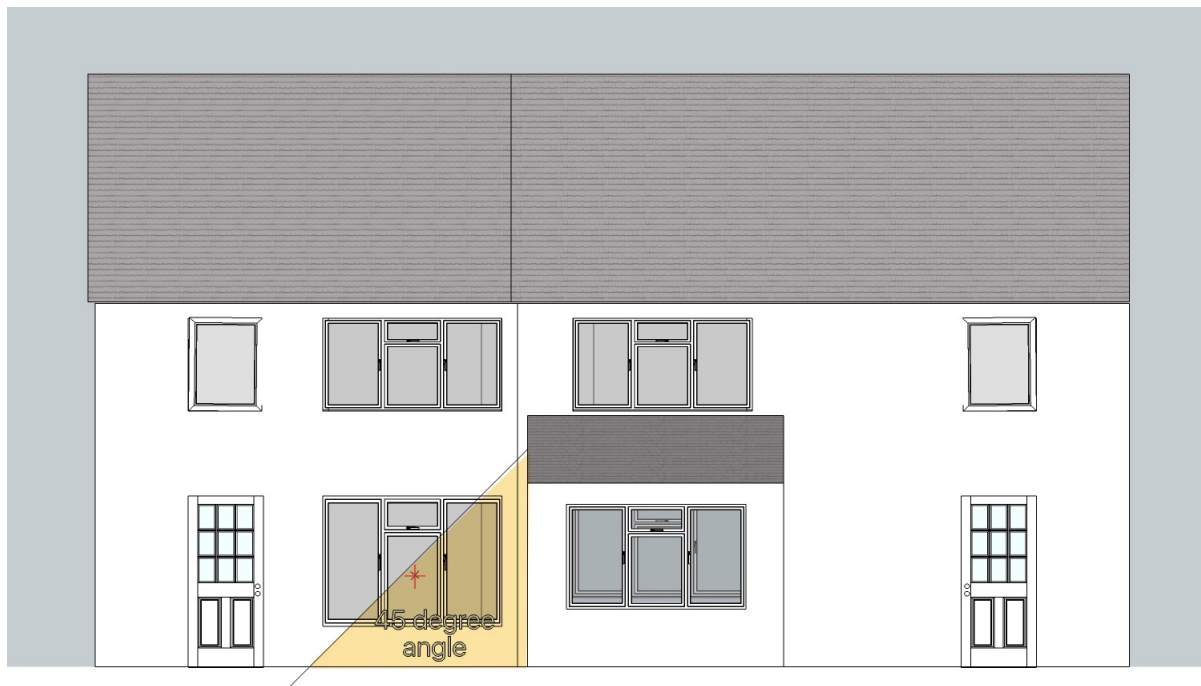




45 degree test in elevation

This test can also be carried out in elevation. In the case of a sloping roof the line can be started half way down the slope of the roof.





In both cases, if the 45 degree line extends above or beyond the centre line of the window, there is a change there will be an adverse affect on daylighting in the neighbouring property. Further testing and daylight studies would therefore be required. If the 45 degree line does not extend beyond the centre point of the window, it would suggest the neighbouring property would continue to receive adequate natural daylight and would not be affected by the proposal.

It is important to take special care when an extension already exists on the other side of the property, as this can cause a tunnel effect.

When the 25 degree or the 45 degree line is breached, the recommended additional tests include:

- > Vertical Sky Component
- > Daylight Distribution / No Sky Line
- > Average Daylight Factor
- > Daylight and Sunlight within the development

Reversing the test

The 25 degree test can also be reversed to establish the effect of the existing properties on the proposed building, and to determine whether or not the design may need to be altered in order to improve quality of daylight reaching the proposed building. There is additional guidance in the BRE Daylight and Sunlight document to suggest suitable window design according to the obstruction of neighbouring windows.

If the obstruction angle is:

- > Less than 25 - a conventional window design should give reasonable results
- > Between 25 and 45 - enlarged windows or changes to room layouts should be considered in order to provide adequate daylight
- > Between 45 and 65 - adequate daylight would not be provided unless very large windows are used

> More than 65 - it is often impossible to provide reasonable daylight, even if the whole wall is glazed

However, further tests can be carried out using further BRE tools to inform your design:

- > Annual Probable Sunlight Hours
- > Room Depth
- > Daylight Distribution
- > Average Daylight Factor

There are some simple ways a design can be improved when daylight is limited and internal layout restrictive. Window sizes should be increased to maximise natural light, it is more effective to do this by raising the window head height to allow more light to enter and the light to be distributed into the room. Reducing the depth of the plan is a very important way to improve the daylight quality in a building. Another method is to improve the external surface reflectances. Having light external paving will allow the light to be reflected back to the building. Internally light colours will allow for light entering the building to be reflected rather than absorbed.

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