

PLASKOLITE

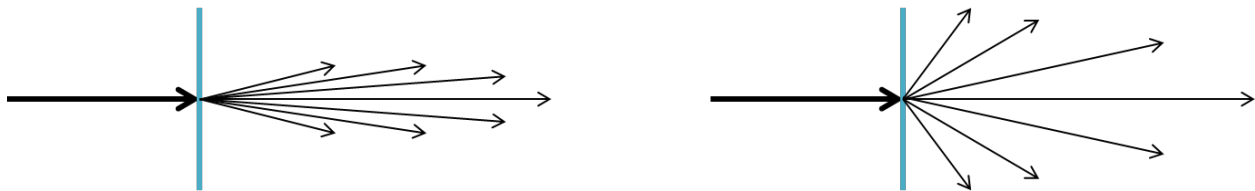
FULL WIDTH HALF MAXIMUM

FULL WIDTH HALF MAXIMUM and HALF ANGLE

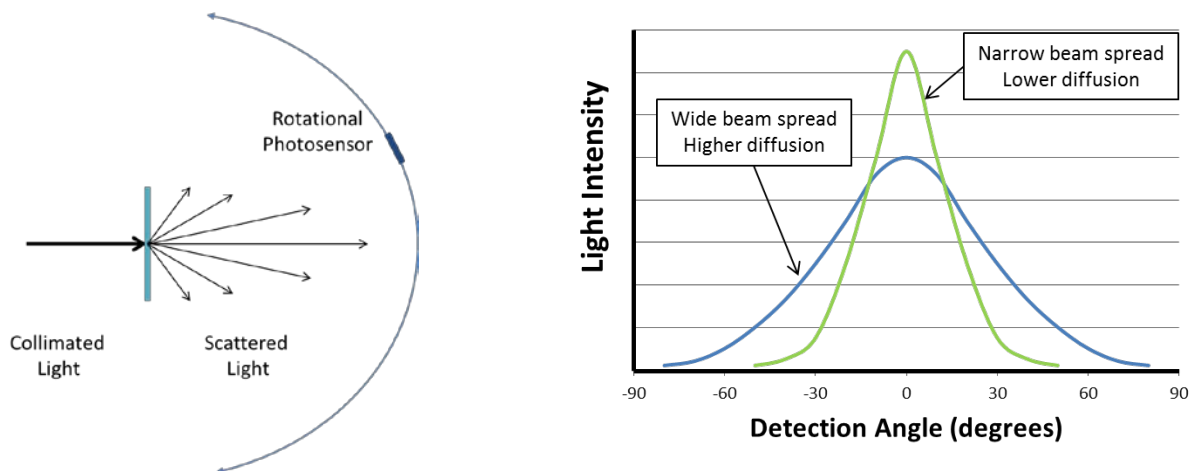
Full Width Half Maximum (FWHM) and Half Angle (HA) are values used to quantify light diffusion and are often used to describe a lighting lens's ability to diffuse light. For both FWHM and HA, a higher value indicates a higher amount of light diffusion.

DEFINITIONS and MEASUREMENT

FWHM and HA are measured using collimated light and a means of measuring light intensity as a function of angle. The light rays in collimated light are parallel and thus they do not spread as they propagate. A laser pointer is a practical example of a collimated light source. A diffusing lens scatters light, changing the direction of the light rays and thus a diffusion lens will spread collimated light. Below are two pictorials of collimated light beams being scattered, the one on the left representing less beam spread (lower diffusion) and the one on the right representing more beam spread (higher diffusion).



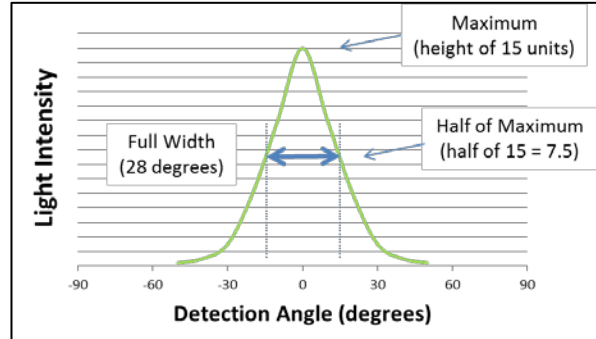
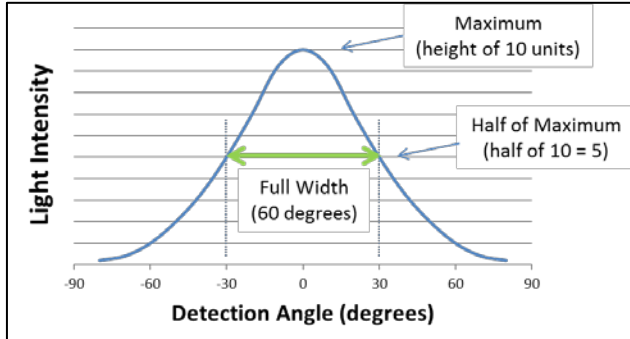
To measure FWHM, instruments use collimated light impinging the sample on one side and the light intensity (luminance) is measured as a function of angle on the other side of the sample. Plotting the luminance as a function of angle, as shown below, visually demonstrates a narrow or wide beam spread corresponding to lower or higher diffusion.



As the name implies, FWHM is a measure of the plot's full width at half of the maximum value. The graphs below display a couple of examples of FWHM. The maximum light intensity of the plot on the left is 10 units, and half of that value would be 5 units. The full width of the plot at half of the maximum (5 units) goes from

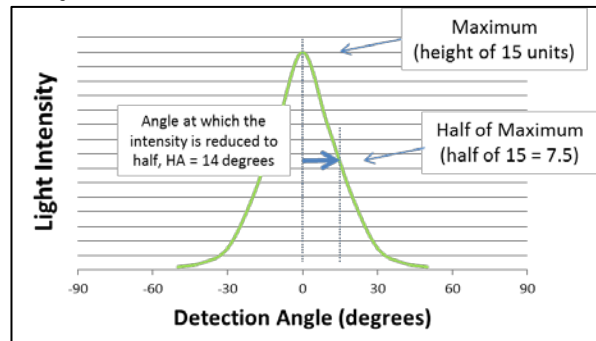
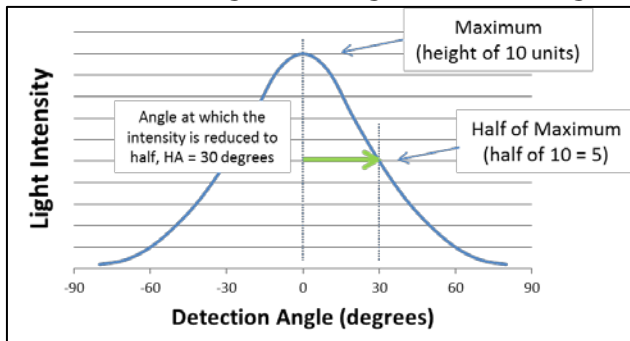
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-30 degrees to +30 degrees or a total of 60 degrees. The FWHM is 60 degrees. The plot on the right has a higher maximum light intensity, 15 units. Taking the full width of the plot at 7.5 intensity units, one gets 28 degrees, the FWHM.



The larger FWHM value describes a wider beam spread, corresponding to more light diffusion.

The methodology for determining Half Angle (sometimes referred to as Half-Value Angle) is very similar to FWHM. The half angle is the angle at which the light intensity decreases to half of its maximum value.



As may be evident from the above examples, the FWHM value is twice the HA value.

COMPARING FWHM VALUES

Two different test apparatuses can give different FWHM results for the same sample. Geometrical considerations of the instrument (such as the size of the photodetector for example) can affect the intensity vs. angle plot and thus affect the FWHM value. Separate instruments will rank a series of samples in the same order, from lower to higher diffusion, but the exact FWHM values may differ. At this time, there are no ASTM or ISO standards defining the test apparatus and procedures.

DISCLAIMER:

These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use are beyond our control. We recommend that the prospective user determine the suitability of our materials and suggestions before adopting them on a commercial scale.