

# Influence of width of launch beam distribution and mode coupling on transmission characteristics of W-type plastic optical fibers

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## Abstract

We show strong effects of width of the launch beam's angular distribution on bandwidth and mode coupling in W-type plastic optical fibers (POFs). In general, the broader this width, the stronger the coupling and the lower the bandwidth—but the bandwidth drop due to this effect tapers off with distance from the input end and ceases at lengths over 25 m as the steady state distribution is reached. With increasing the strength of mode coupling, the equilibrium mode distribution is reached at shorter fiber lengths, which results in slower bandwidth decrease and finally in higher bandwidth at longer fiber lengths for fibers with larger coupling coefficients  $D$ . These results are aimed at aiding designers and application integrators of W-type POFs, particularly in employing laser, LED or vertical cavity surface emitting laser (VCSEL) light source.

Keywords: plastic optical fibers, mode coupling, equilibrium mode distribution, bandwidth

(Some figures may appear in color only in the online journal)

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