

Launch Conditions for Multimode Testing

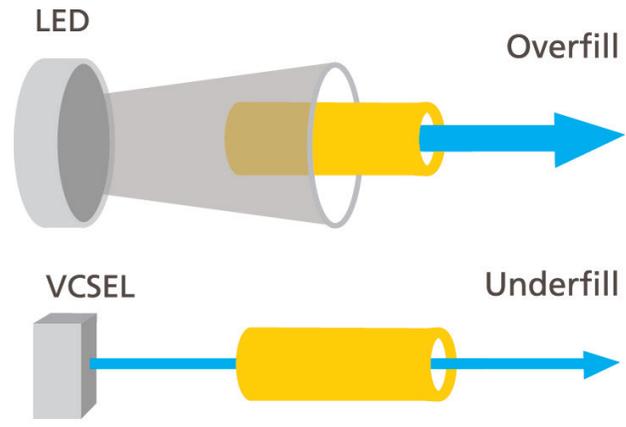
Overview

An LED light source is required per **IEC 61300-3-4** for testing insertion loss on multimode cabling/connectors. When LASER sources are used, outside influences, such as movement and settling in cable as well as changes in temperature, can cause output power instability which can affect insertion loss test results.

Controlling launch conditions is an important part of insertion loss testing. If the launch conditions are not defined or known for the reference lead and optical source, then the results will tend to be skewed depending on whether the **launch overfills** or **underfills** the fiber.

Overfilled launches will lead to pessimistic insertion loss results. In other words, this will cause perfectly good cables to register as failing. These launch conditions can be the result of a 62.5µm launch being used to test 50µm fiber or similar situations.

Underfilled launches will provide overly optimistic insertion loss results. These types of launch conditions can be the result of a laser launching into multimode fiber or from excessive mandrel wrapping of the fiber. While these launch conditions may accurately represent the sources used in the real-world applications of a given device-under-test, they do not provide an accurate characterization of the insertion loss of the cables.



Two different fill conditions: Overfill (LED) and Underfill (VCSEL).

Encircled Flux compliant launch conditions (**per IEC 61280-4-1**) are required for testing 50/125µm multimode cables at the 850nm wavelength. Using a standards-defined launch condition, such as the **EF launch**, allows for increased repeatability, reproducibility, and accuracy.

Bend-Insensitive Multimode Fiber

Bend-Insensitive Multimode Fiber, or **BIMMF**, as its name suggests, is more impervious to bend loss than standard 50µm multimode cable. In fact, **BIMMF** is so resistant to bend loss that measurements taken with a 22mm mandrel produce essentially the same results as without a mandrel.

While bend insensitive fiber is, in many ways, interchangeable with standard 50µm cabling, it should not be used as a reference cable for testing insertions loss. Testing insertion loss and return loss on **BIMMF** cables should be handled as though the cables were not bend-insensitive. In general, it is suggested that reference cables should always be made from non-bend-insensitive fiber, which also allows for one to properly condition the launch if necessary.

It is recognized that current standards suggest that the fiber type of the reference cord should be the same as the test cord, but standards are being modified to accommodate for **BIMMF** testing.