

Prime Photonics makes a number of optical probes for blade tip timing (BTT) measurement. Selection of a probe depends on the application.

Lensed or Unlensed

Unlensed probes are the simplest type of probes. The tip of the probe is the polished end of the optical fiber. These probes are used for short range measurement, typically from 0.02" to 1/4" (0.5 to 6 mm).

Lensed probes include a lens system to focus the light to a specific focal point. A working range for the probe is determined based on the range in which the send and receive signals overlap. The working range can be customized. Lensed probes are mainly used for long range applications.

Lensed probes also present the advantage of being more resistant to fouling and easier to clean, so they are the preferred choice in environments where contaminants are present such as in turbine stages.



Clockwise from top left: Thin Unlensed Probe; Right Angle Probe; Lensed Probe; Periscope Probe

Configurations

The most common configuration is an axial probe to measure blade tips.

A right angle probe is a variation with the cable exiting out the side of the probe head (at a 90° angle). This probe configuration is used in tight spaces where height is limited for installation and removal.

Lensed probes can also be configured with a look-down angle. Prime Photonics has made 45° look-down angle probes and periscope probes with a 90° angle.

Environment

Lensed probes are rated for continuous operating temperatures up to 590 °C (1100 °F) uncooled. Unlensed probes are rated for continuous operating temperatures of 700 °C (1292 °F)

Gas flow lines can be added to most probes. This is used both for cooling and for maintaining cleanliness in dirty environments.

PARAMETERS TO SPECIFY A PROBE

- Dimensions of the probe tip, particularly diameter and length
- Environmental conditions (especially maximum temperature) for the probe tip and cable
- Probe mounting scheme (flange or other interface)
- Length and type of cable
- Cable routing details
- Connector type (FC, ST, and SMA standard)