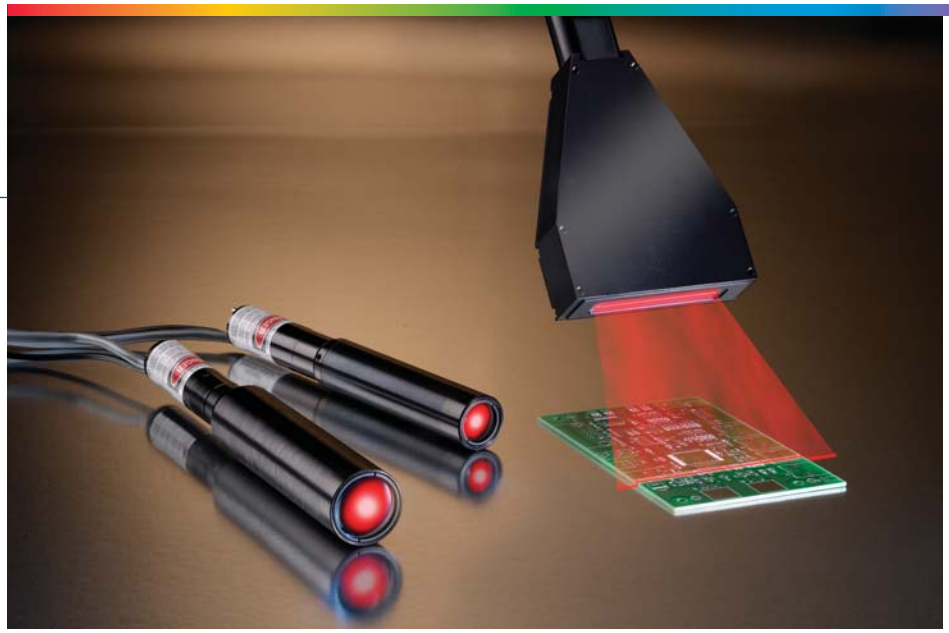
# Lasiris™ Telecentric Micro-Focus Laser



## Features

- Line width remains constant along line length
- Extremely thin lines down to 9.0 µm at $1/e^2$
- Line length up to 60 mm
- Highly efficient optical system
- Uniform intensity distribution
- ESD, over-temperature, over-voltage, and reverse-polarity protection
- Two year warranty

### Micro-focus laser that projects telecentric laser line patterns

StockerYale's Lasiris™ T-MFL Micro-Focus lasers produce long telecentric lines as thin as 9.0 µm $1/e^2$ at a specified working distance and are designed for applications where utmost accuracy and precision are required.

This technology benefits applications such as inspection of microelectronics, solar cell inspection, high resolution 3-D contour mapping, and other machine vision systems.

Lasiris™ T-MFL lasers use refractive uniform line generator optics without beam clipping. Our wide range of standard and custom models have exceptional mechanical stability, ESD protection, and feature a fully protected integrated laser diode driver.

StockerYale

## Applications

The T-MFL series was designed for applications that require the utmost accuracy and precision. Specific examples include:

- Precision inspection of small parts such as chips, wafers, small pins, resistors, semiconductor components
- Solar cell inspection
- High precision surface analysis
- Machine vision
- 3-D contour mapping
- Industrial inspection
- Bio-detection

## Options and custom units

The laser is available with options allowing you to strobe or control its output electronically (refer to the Pulsing and Power Adjustment section). Please contact our application engineers for specific requests, since custom units can be built for specialized applications.

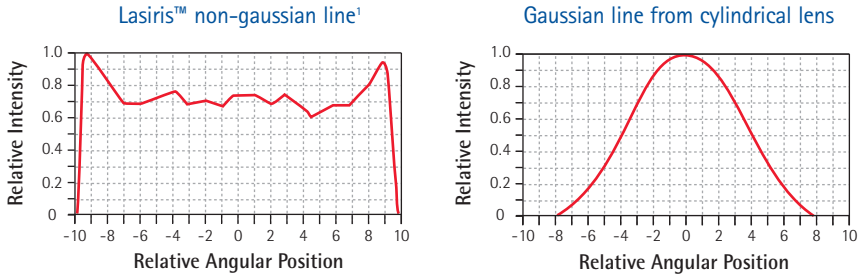
## Available patterns

Single Line

## Uniform intensity

Laser line patterns are often generated by cylindrical optics that produce a gaussian line profile with a bright center and fading ends. Lasiris™ patented optics spread the light into an evenly illuminated line. The result is crisp, uniform lines with sharp ends.

### Line intensity profile along line length




Relative intensity vs. angular position along line length

1) Typical profile

## Line thickness and depth-of-field

T-MFL lasers feature factory-set focusing for specific working distances. The table below shows the typical thickness (at $1/e^2$) and depth-of-field performance of a 660 nm wavelength T-MFL. The depth-of-field is defined as twice the distance over which the thickness of the line has increased by a factor of $\sqrt{2}$.

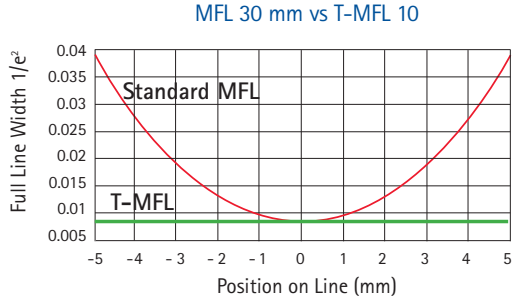
Main characteristic of the T-MFL laser is its ability to maintain a constant line thickness along the entire line length when projected on a flat plane.

| | T-MFL55 | T-MFL120 | T-MFL125 |
|---|---|---|---|
| Depth of Field | 0.2 mm | 1 mm | 1 mm |
| Working Distance | 55 mm | 120 mm | 125 mm |
| Line Width | 9 µm | 25 µm | 25 µm |
| Line Length* | 5-10 mm | 10-30 mm | 30-60 mm |
| Line Uniformity | <=25 % | <=25 % | <=25 % |

*Line length can be customized

## Line thickness versus position on line

### Thickness versus position




The 'Thickness versus position' graph shows how the line thickness of the MFL laser increases farther away from the center of the line.

The T-MFL is built with an optical system that creates a constant line thickness when the laser is projected on a flat plane.

## Lasers and eye safety

Our lasers can comply with CDRH and IEC certification and fall in different safety classes depending on output power, wavelength and fan angle. According to CDRH 21CFR1040.10 regulations, they can be classified Class II, Class IIIa, or Class IIIb.

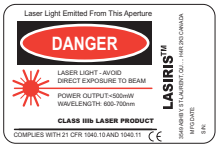
According to IEC 60825-1 regulations, they can be classified Class 1, 1M, 2, 2M, 3R, or 3B. For Class 1M and 2M lasers, viewing the laser output with certain optical instruments (magnifiers, binoculars, etc.) may pose an eye hazard.

Call us or visit our website for further details.

### Class II


### Class IIIa


### Class IIIb


CAUTION: It is important to follow laser safety rules and wear appropriate protective eyewear when working around lasers. Use of controls, adjustments or performance of procedures other than those specified in the instruction manual may result in hazardous radiation exposure.

## Specifications

### Mechanical specifications

| | |
|---|---|
| Dimensions | See dimensional diagrams |
| Housing material | Aluminum, black anodized |

### Optical specifications

| | |
|---|---|
| Diode power | 100 mW |
| Wavelength | 660 nm |
| Intensity distribution | Uniform (non-gaussian) for line |
| Bore sighting | <3 mrad |

### Environmental specifications

| | |
|---|---|
| Operating temperature | -10°C to +48°C |
| Wavelength drift | 0.25 nm/°C typical |
| Thermal stability | Less than 5% change in focus over multiple temperature cycling from 10°C to 30°C |
| Over-temperature protection | Built-in: 48°C |

### Electrical specifications: Power supply

| | |
|---|---|
| Input voltage | 5 - 6 VDC<br>Optional 9,12,24 VDC, 115/220 VAC |
| Connector type | Male phono-jack 3.5 mmØ,<br>or custom |
| Slow start time delay | 10 µsec |
| Reverse-polarity protection, Over-voltage protection | |

## Options

### Power options

**Power Adjustment Potentiometer**

The laser power can be easily changed by adjusting an optional built-in potentiometer with a small screwdriver. Indicate Code "P".

**Pulsing & Power Adjustment**

The power can be modulated or pulsed using an external signal. Input voltage of 0 VDC: "on", 5 VDC: "off" (or can be reversed). See figure below.

Coding:

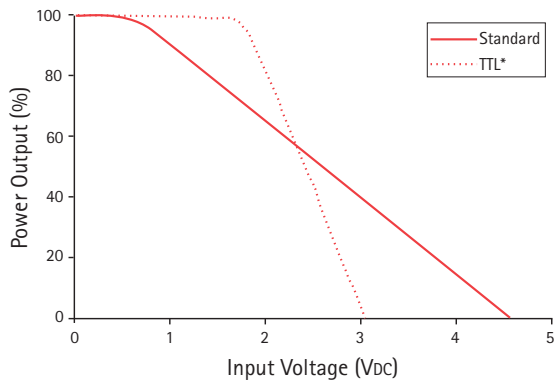
- Standard S: 10 kHz FS*: 500 kHz
- TTL T*: 10 kHz FT*: 500 kHz

2 MHz available.

| | |
|---|---|
| Impedance | > 1 kΩ |
| Rise/Fall time | 10 µsec for 10 kHz, 0.23 µsec for 500 kHz |

### Power adjustment curves

Frequencies of 10 kHz & 500 kHz




*Not available on all models.

The standard slope can be modified.

### Separate electronics option

The electronics of the laser can be separated. Indicate code "SD".

## Ordering Information

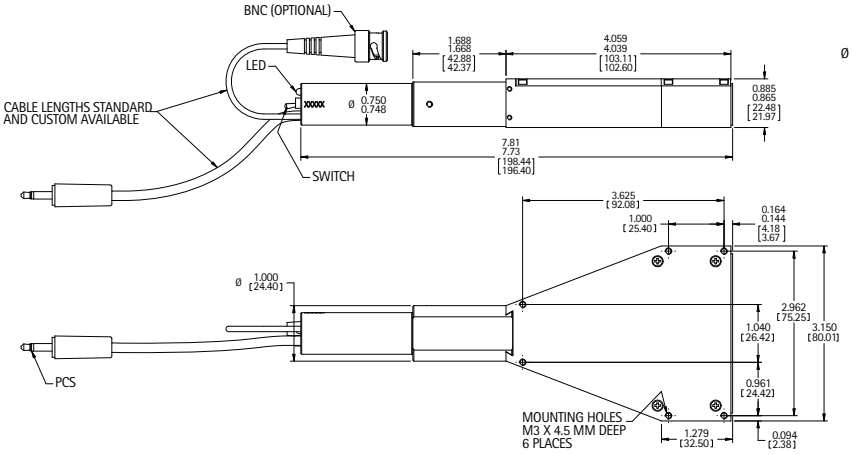
Our telecentric micro-focus lasers 660 nm are covered under a 2-year warranty (parts & labor). To order, select from the specifications below. Code: TMFL - Wavelength - Diode Power - Electronics Option - Working Distance - Line Length.
**E.g., TMFL-660-100-P-55-10, TMFL-660-100-FT-125-30 etc.** Call us or visit our website for updates and other specifications.

| Model | Wave Length (nm) | Diode Power (mW) | Electronics Option | Working Distance (mm) | Line Length (mm) |
|---|---|---|---|---|---|
| | | | | 55 | 5 |
| | | | | | 7 |
| | | | | | 10 |
| | | | N/A | | |
| | | | P | 120 | 10 |
| TMFL | 660 | 100* | T | | 20 |
| | | | S | | 30 |
| | | | FS | | |
| | | | FT | 125 | 30 |
| | | | | | 45 |
| | | | | | 60 |

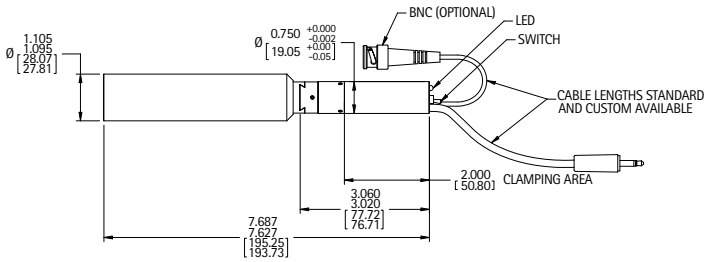
*Also available in 670 nm - 500 mW, 810 nm - 1 W. Power can be adjusted down to 20 mW by potentiometer as a standard option. Please call us for more details.

## Dimensional Diagrams

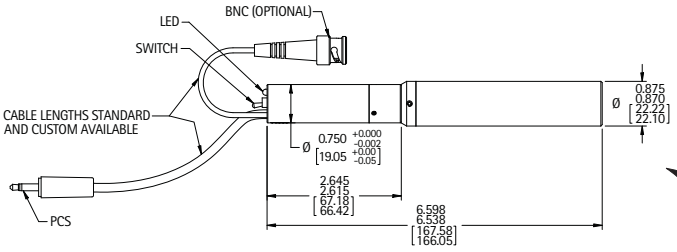
### TMFL 125




### TMFL 120




### TMFL 55

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