

METHANE FROM FLARING TOOLKIT



L2F Optical Flow Meter

How do I measure flow? > [L2F Optical Flow Meter](#)

Optical flow metering is an emerging technology for natural gas and flare measurement. It uses optical laser technology to measure the actual speed of particles rather than the speed of sound through a medium (as in ultrasonic flowmeters) or conductivity (as in mass thermal flowmeters).

How it Works

The Laser-Two-Focus (L2F) technology uses two laser beams to detect the passage of any light-scattering particles carried along by the moving fluid.

As a particle passes through each laser beam, it redirects the light away from its normal straight-line path in such a way that an optical sensor (one per beam) detects the scattered light and generates a pulse signal.

As that same particle passes through the second beam, the scattered light excites a second optical sensor to generate a corresponding pulse signal.

The time delay between two successive pulses is inversely proportional to the velocity of that particle.

IMAGE TO FOLLOW

In order, to obtain a measurement of bulk (average) fluid velocity, the raw velocity measurement provided by the sensor must be corrected based on the expected Reynolds number for the process fluid, which is why insertion L2F flowmeters are equipped with pressure and temperature transmitters in addition to the optical probe.

When the three measurements (pressure, temperature, and velocity at the probe) are combined, the [Reynolds number](#) may be calculated which then predicts how “flat” (consistent) the velocity profile is for the fluid stream.

IMAGE TO FOLLOW

Advantages

- ✓ Moderate sensitivity to entrained mist or liquid
- ✓ Meter diagnostics can detect fouling prior to failure of the unit (does not require physical inspection which may require the line to be removed from service)
- ✓ Good turndown ratio (1000:1 to 1500:1)
- ✓ Good accuracy over a large measurement range (e.g., 1 to 100 m/s)

Limitations

- ✗ High sensitivity to fouling
- ✗ Sensitive to flow disturbances
- ✗ Accuracy decreases within low measurement ranges (e.g., 0.1 to 1 m/s)
- ✗ Limited industry experience with flare service
- ✗ The meter may be difficult to extract for maintenance while line is in service

Go Deeper

- [Flowoptical.com](https://www.flowoptical.com)

Flare Metering with Optics From Blue-Sky Technology to the Real World

Case study

No case study available at this time.

How do I measure flow?



Flow: Ultrasonic & Sonar Clamp-on Flow Meters



Flow: Vortex Flow Meter



Flow: Coriolis Flow Meter



Flow: Ultrasonic Flow Meter



Flow: Scintillation Optical Flow Meter