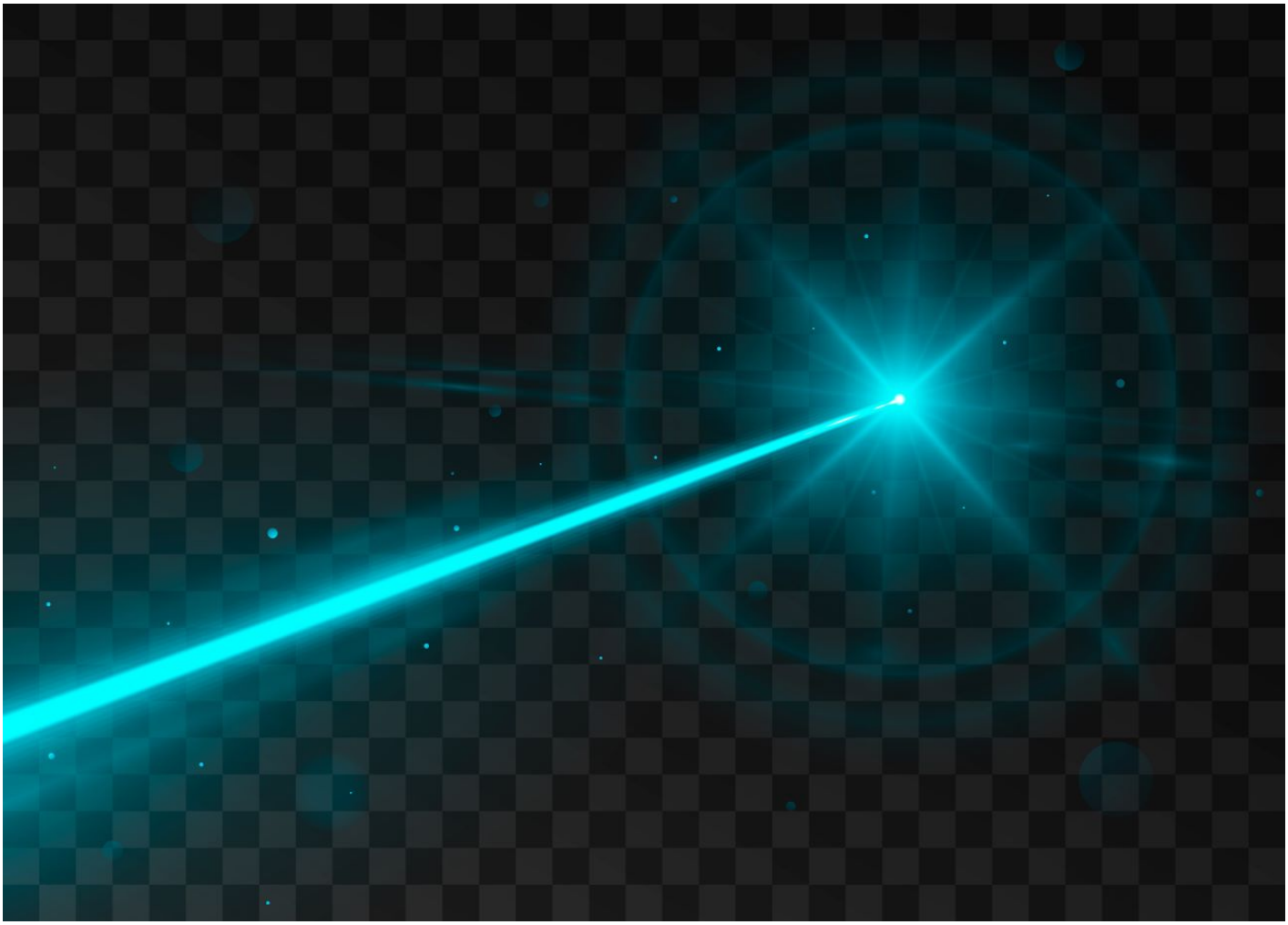
METHANE FROM FLARING TOOLKIT



# Flow: Scintillation 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

Scintillation optical flow meters rely on the principle of scintillation, whereby the fluid itself warps the path of light passing through, rather than relying on entrained particulate matter to scatter the light.

Scintillation is the same phenomenon responsible for the “twinkling” of stars and city lights viewed from a long distance, as air passes between the light and the observer, pockets of air having different density (due to differences in temperature) and/or sufficient turbulence cause some of the light to be refracted away from an otherwise straight-line path, making it appear as though the light source is randomly vibrating or oscillating.

Velocity measurements are inferred by a scintillation flowmeter by measuring the time difference between two sensors’ detection of the same scintillation pattern.

Therefore, the scintillation flowmeter applies the same basic formula v = d/t to calculate fluid velocity.

AWAITING IMAGE

Scintillation-style optical flowmeters require a long optical path in order to maximize the angle at which light will be refracted.

Thus, they function best when used to measure across the full diameter of a pipe. An interesting feature of this flowmeter technology is that it functions best when the flow regime is highly turbulent, since increased fluid turbulence leads to greater scintillation.

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

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

Case study

No case study available at this time.

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## How do I measure flow?

Flow: Ultrasonic & Sonar Clamp-on Flow Meters

Vortex Flow Meter

Flow: Coriolis Flow Meter

Flow: Ultrasonic Flow Meter

L2F Optical Flow Meter