Dräger

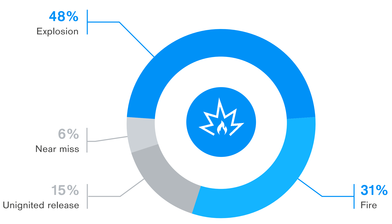
Technology for Life

Invisible Danger: Detecting hydrogen flames

Firestarter hydrogen

Hydrogen can be a safety challenge: Nearly one third of reported incidents resulted in fire, half in explosions.

Consequences of reported hydrogen related events



Safety challenges of hydrogen

Leaks easily and can diffuse containment materials due to its small molecules

Has a 15 times lower level of ignition energy than methane

Is ignitable even in low concentrations in air (≥ 4 %)

Is 14 times lighter than air and dilutes quickly in ventilated outdoor areas

Is nearly invisible to the human eye

Why are hydrogen flames special?

The properties of flames can vary drastically depending on the chemical composition of the burning material and its immediate reaction products, especially for hydrogen flames.

Comparison hydrocarbon fire vs. hydrogen fire

	Hydrocarbon	Hydrogen
Visibility	Visible in daylight	Nearly invisible in daylight
Heat	Radiate heat	Emit little radiant heat
Odor	Yes	No
Emissions	CO_2, O, N, H_2O vapors	H_2O

Hydrogen flame detection

Due to their properties, hydrogen flames are barely perceptible to human senses and some flame detectors.

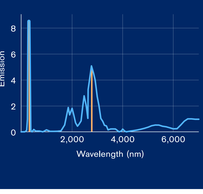
Which flame detectors are suitable for hydrogen fires?

	UV/IR detector	IR3 H_2 detector
Pros	Fast reaction time	Fast reaction time
	Medium detection distance	Large detection distance
		High immunity to false alarms
Cons	Sensitive to false alarm sources	

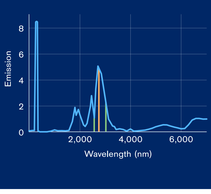
When reliability is a factor

Hydrogen flames emit electromagnetic radiation at a specific wavelength, making IR3 H_2 detectors particularly suitable and reliable when worker safety is at stake.

Wavelengths measured by UV/IR detector



Wavelengths measured by IR3 H_2 detector



Increase safety with a matrix of technologies

Hydrogen flame detection is best combined with other technologies like catalytic point gas and UGLD to maximise safety.

Flame detection with the newest generation of Triple-IR-sensor

Dräger Flame 1750 H2

Point Gas Detection with catalytic bead transmitter for flammable gases

Dräger Polytron® 8200 CAT

Ultrasonic Gas Leak Detection with Dräger Polytron®

Dräger Polytron® 8900 UGLD

Want to know more?

H_2 SAFETY

> Get in touch with our experts!

www.draeger.com/hydrogensafety