OPTICAL GAS IMAGING
Infrared Cameras for Gas Leak Detection
MAKE INVISIBLE GASES VISIBLE
SAVE LIVES, REVENUE, AND THE DAY

A facility can have thousands of connections and fittings that require regular inspection, but the reality is only a small percentage of these components will ever leak. Testing them all with a traditional “sniffer” takes a great deal of time, effort and may put the inspector in an unsafe environment.

From natural gas extraction to petrochemical operations and power generation, companies have saved more than $10 million annually in lost product by including FLIR optical gas imaging in their leak detection and repair (LDAR) programs.

Optical gas imaging cameras give you the power to spot invisible gases as they escape, so you can find fugitive emissions faster and more reliably than with sniffer detectors. With a FLIR GF-Series camera, you can document gas leaks that lead to lost product, lost revenue, fines, and safety hazards.

METHANE AND HYDROCARBONS
Scan thousands of connections for natural gas (methane) and other hydrocarbon leaks quickly and from a safe distance to avoid regulatory violations, fines, and lost revenue.

HYDROGEN (CO₂ TRACER GAS)
Imaging the tracer gas, CO₂, with an optical gas camera allows operators of hydrogen-cooled generators to efficiently find hydrogen leaks.

CARBON DIOXIDE (CO₂)
Prevent shut-downs by detecting carbon dioxide (CO₂) leaks early in chemical production, manufacturing, and Enhanced Oil Recovery programs.

CARBON MONOXIDE (CO)
Protect workers and the environment from toxic levels of carbon monoxide (CO) by pinpointing leaks quickly and efficiently.

REFRIGERANTS
Find leaks early to avoid interruptions in operations, prevent the loss of perishable products, and limit the environmental impact of toxic refrigerants.

SULFUR HEXAFLUORIDE (SF₆)
Scan substation circuit breakers for sulfur hexafluoride (SF₆) leaks at a safe distance from high-voltage areas, without the need to shut down operations.
TRACK LEAKS TO THEIR SOURCE
GF-Series optical gas imaging cameras can detect natural gas, SF₆, and CO₂ leaks quickly, accurately, and safely without the need to shut down systems, or the need for contact with the components. Gas leaks that are invisible to the naked eye look like smoke on infrared optical gas imaging cameras, making them easy to see—even from a distance.

WITH FLIR OPTICAL GAS IMAGERS, YOU CAN:
• Scan broad areas quickly, from a safe distance
• Survey hard-to-reach connections and fittings
• Improve compliance with environmental regulations
• Check electro-mechanical systems for signs of failure, using temperature measurement capability
• Check tanks for leaks, level and efficiency

HANDBHELD CAMERAS
When you need to survey large work areas for industrial gas or chemical leaks, a handheld optical gas imaging camera can help you get the job done quickly and efficiently. Cameras such as the GFx320, GF306, and GF346 allow you to check every component throughout multiple sites, and are ergonomically designed for comfortable, all-day use. These cameras also offer features such as temperature calibration for improved contrast between the gas compound and the background scene.

GF-SERIES HANDHELD CAMERAS ARE IDEAL FOR:
• Natural gas wellsites
• Chemical processing plants
• Electrical substations
• Manufacturing plants
• Power generators
• Refineries

HANDHELD CAMERAS ARE IDEAL FOR:
• Chemical processing plants
• Manufacturing plants
• Power generators
• Refineries

FIXED CAMERAS
Have a need for continuous monitoring or automated leak detection in critical areas? With thermal imaging cameras such as the G300a and GF77a, you can constantly monitor vital gas pipelines, installations and critical components in remote or difficult to access zones. You will immediately see if a dangerous and costly gas leak appears. Monitoring is performed from a safe distance without the need to send technicians into potentially dangerous areas.

G300A AND GF77A CAMERAS ARE IDEAL FOR:
• Offshore oil platforms
• Natural gas processing plants
• Biogas generation plants
• Petrochemical facilities
• High value well sites
• Underground storage facilities
• Critical pipeline crossings
• Compression stations

HELPFUL ACCESSORIES
FLEXIBLE SYSTEMS THAT MEET YOUR CHANGING NEEDS
No other thermal imaging camera manufacturer offers a wider range of accessories than FLIR Systems. Hundreds of accessories are available to customize our cameras for a wide variety of imaging and measurement applications. From a comprehensive range of lenses, through LCD screens, to remote control devices, everything is available to tailor your camera to your specific application.

HELPFUL ACCESSORIES ARE IDEAL FOR:
• Offshore oil platforms
• Natural gas processing plants
• Biogas generation plants
• Petrochemical facilities
• High value well sites
• Underground storage facilities
• Critical pipeline crossings
• Compression stations
METHANE & HYDROCARBONS

**FLIR GF77™**
Gas Find IR with LR lens
The FLIR GF77 with the LR (7-8.5 µm) lens—designed exclusively for the GF77 uncooled optical gas imaging camera—visualizes methane in real time for faster, more efficient gas leak surveys. This affordable solution is useful for both gas detection and radiometric temperature measurement, so you can safely locate leaks and perform accurate thermal inspections using one camera.

**GF77 CAMERAS WITH LR LENSES ARE IDEAL FOR:**
• Electric power utilities
• Oil and natural gas operations
• Chemical/manufacturing facilities
• First responders

**FLIR GF77a™**
Fixed Gas Find IR
The FLIR GF77a provides continuous, autonomous leak detection for methane. This uncooled, fixed OGI camera can help you better maintain valuable capital equipment, avoid product loss, meet emissions reduction metrics, and ensure safer work practices. With advanced connectivity features that meet current industry protocols, this camera will integrate seamlessly into your current ecosystem.

**GF77a CAMERAS ARE IDEAL FOR:**
• Upstream oil and gas facilities
• Transportation terminals
• Power generation plants
• Midstream gas processing facilities

**FLIR G300a™**
The FLIR G300a is a cooled, fixed camera that detects hydrocarbons and volatile organic compound (VOC) leaks that are harmful to the environment. It allows users to continuously monitor installations in remote areas or hazardous zones that are difficult to access, so inspectors can take immediate action to repair dangerous or costly leaks. The G300a is easily controlled over Ethernet from a safe distance and can be integrated in a TCP/IP network. With a robust but small frame, the G300a also integrates to an aerial platform for OGI inspections from the sky.

**G300a CAMERAS ARE IDEAL FOR:**
• Oil refineries
• Natural gas processing plants
• Offshore platforms
• Chemical/petrochemical complexes
• Biogas and power generation plants
• Regulatory compliance
The FLIR GFx320, GF620, and GF320 are cooled OGI cameras that are filtered to detect methane and hydrocarbon emissions from the production, transportation, and processing facilities in the oil and gas industry. Survey large areas up to nine times faster than with traditional gas sniffer methods to catch leaks early and reduce emissions.

Providing up to 640 × 480 IR resolution (GF620) and highly accurate temperature measurements, inspectors can assess and improve thermal contrast between the gas cloud and the background.

The GFx320, GF620 and GF320 are verified to meet sensitivity standards defined in the US EPA’s OOOOa methane rule and meets reporting requirements by tagging each recording with GPS data. By finding leaks and fixing them quickly, companies can protect the environment while avoiding product losses and regulatory fines.

Safely scan for gases at great distances on difficult to monitor components, check thousands of connections quickly, and pinpoint the smallest leaks.

METHANE & HYDROCARBONS

• Methane
• Methanol
• Propane
• Benzene
• Ethane
• Propylene
• Ethanol

• Pentane
• Ethylbenzene
• MEK
• MBK

• i-Pentene
• Isoprene
• Butane
• Ethylene
• Ethylbenzene
• Xylenes
• Hexane

HAZARDOUS LOCATIONS

The FLIR GFx320 allows you to quickly detect and visualize fugitive natural gas emissions while maintaining safety inside hazardous locations. This OGI camera is certified for use in Class 1; Division 2 or Zone 2 hazardous locations, improving worker safety and potentially reducing pre-survey paperwork (depending on company protocols).

THE GFx320/GF320 DETECT NEARLY 400 GASES, INCLUDING:

THE GFx320 HAS THE FOLLOWING CERTIFICATIONS:

ATEX/IECEx, Ex ic nC T4
ANSI/ISA-12.12.01-2013, Class I Division 2
CSA 22.2 No. 213, Class I Division 2

Q-MODE

Save time post-processing data with Q-Mode (Quantification Mode). This setting automatically prepares the camera for gas quantification with QL320 software (sold separately), allowing you to measure and confirm the size of leaks when surveying components that are difficult to measure or hard to access. All new FLIR cooled OGI cameras offer this feature; just turn the dial to “Q-Mode” on the camera’s mode wheel, and it will automatically record files in a format that will seamlessly integrate into the QL320 system to quantify gas leaks without wires. If you own an older FLIR cooled OGI camera model without Q-Mode, you may send it to our service center to install it on your existing camera.
**SULFUR HEXAFLUORIDE AND AMMONIA**

**FLIR GF77™ Gas Find IR with HR lens**

The FLIR GF77 with the HR (9.5-12 µm) lens — designed exclusively for use with this uncooled OGI camera — detects and visualizes sulfur hexafluoride (SF₆), ethylene, and ammonia. This affordable solution is useful for both gas detection and radiometric temperature measurement, so you can safely locate leaks and perform accurate thermal inspections using one camera.

**FLIR GF306™**

The FLIR GF306 detects SF₆ — used to insulate high voltage circuit breakers — as well as the industrial refrigerant and fertilizer anhydrous ammonia (NH₃). SF₆ is a potent greenhouse gas, with a global warming potential that’s 22,000 times greater than CO₂ over a 100-year period. By detecting and repairing SF₆ leaks, energy producers can avoid costly damage to circuit breakers while protecting the environment.

**GF306 DETECTS THE FOLLOWING GASES:**
- Acetic acid
- Acetyl chloride
- Allyl bromide
- Allyl chloride
- Allyl fluoride
- Anhydrous ammonia
- Bromomethane
- Chlorine dioxide
- Ethyl cyanocrylate
- Ethylene
- Ethylene oxide
- Formaldehyde
- Hydrazine
- Methane
- Methanol
- Methyl chloride
- Methyl ethene ketone (MEK)
- Methyl fluoride
- Methyl vinyl ketone
- Propane
- Propylene
- Sulfur hexafluoride
- Tetrahydrofuran
- Trichloroethylene
- Vinyl chloride
- Vinylidene chloride
- Vinylmethylcarbinol
- Vinyl cyanide
- Vinyl ether

**GF306 CAMERAS ARE IDEAL FOR:**
- Utilities
- Ammonia plants
- Industrial refrigeration systems
- Chemical plants

**GF77 CAMERAS WITH HR LENSES ARE IDEAL FOR:**
- Electric power utilities
- Oil and natural gas operations
- Chemical/manufacturing facilities
- Food and agriculture
- First responders

**REFRIGERANTS**

**FLIR GF304™**

The FLIR GF304 detects refrigerant gas leaks without interrupting or shutting down operations. Most modern refrigerants are organofluorine compounds, and while they are not ozone-depleting, some blends contain Volatile Organic Compounds (VOCs). Refrigerants are used in a variety of systems, including food production, pharmaceutical storage, and air conditioning.

**GF304 DETECTS THE FOLLOWING REFRIGERANT GASES:**
- R12
- R125
- R134a
- R245fa
- R410A
- R417A
- R422A
- R507A
- R507A

**GF304 CAMERAS ARE IDEAL FOR:**
- Food production, storage, and retail
- Automotive production and repair
- Air conditioning
- Pharmaceutical production, transport, and storage

**GF77 CAMERAS WITH HIGH SENSITIVITY MODE (HSM)**

**GF304 CAMERAS WITH HR LENSES**
The GF343 lets you see carbon dioxide (CO₂) leaks quickly and accurately, whether the gas is the result of a production process, part of an Enhanced Oil Recovery program, or being used as a tracer gas for hydrogen. CO₂ is a primary greenhouse gas, with emissions resulting not only from the combustion of fossil fuels but also from industrial processes, oil production, and manufacturing. Reliable non-contact CO₂ detection allows plants to inspect equipment while it is still online in the course of normal operations, avoiding unplanned outages. It also helps keep operations safe while moving towards carbon-neutral capture and storage operations.

The FLIR GF346 exposes invisible, odorless carbon monoxide (CO) emissions from a safe distance. CO leaking from vent stacks or pipes can be deadly, especially if the gas is allowed to collect in an enclosed area. The GF346 can quickly scan broad areas and pinpoint even small leaks from several meters away, increasing worker safety and protecting the environment.

GF343 CAMERAS ARE IDEAL FOR:
- Enhanced Oil Recovery programs
- Hydrogen-cooled power generators
- Carbon capture systems
- Ethanol producers
- Industrial tightness testing

GF346 CAMERAS ARE IDEAL FOR:
- Steel industry
- Bulk chemicals manufacturing
- Packaging systems
- Petrochemical industry

GF346 DETECTS CARBON MONOXIDE AND THE FOLLOWING GASES:
- Acetonitrile
- Acetyl cyanide
- Acrolein
- Bromine isocyanate
- Butyl isocyanide
- Chlorine isocyanate
- Chlorodimethylsilane
- Cyanogen bromide
- Dichloromethylsilane
- Ethene
- Ethyl thiocyanate
- Germane
- Hexyl isocyanide
- Ketene
- Methyl thiocyanate
- Nitrous oxide
- Silane
## SPECIFICATIONS

<table>
<thead>
<tr>
<th>GF620</th>
<th>GFx280</th>
<th>GF320</th>
<th>GF77</th>
<th>GF304</th>
<th>GF266</th>
<th>GF346</th>
<th>GF343</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Gas Scan</strong></td>
<td>Hydrocarbons (CxHx)</td>
<td>Hydrocarbons (CxHx)</td>
<td>Hydrocarbons (CxHx)</td>
<td>Alk. hydrocarbons/air, inert gases, propane, sulfur dichloride, R-134a and R-152a</td>
<td>C2H4</td>
<td>C2H6</td>
<td>CH4</td>
</tr>
<tr>
<td><strong>Detector Type</strong></td>
<td>Coated InSb</td>
<td>Coated InSb</td>
<td>Coated InSb</td>
<td>Uncooled microbolometer</td>
<td>Coated InSb</td>
<td>Coated InSb</td>
<td>Coated InSb</td>
</tr>
<tr>
<td><strong>Spatial Resolution</strong></td>
<td>3.2 ~ 3.4 μm</td>
<td>3.2 ~ 3.4 μm</td>
<td>3.2 ~ 3.4 μm</td>
<td>Uncooled (0.02°/m)</td>
<td>30°C to 100°C</td>
<td>30°C to 100°C</td>
<td>30°C to 100°C</td>
</tr>
<tr>
<td><strong>Radiation</strong></td>
<td>640 × 480 (307,200 pixels)</td>
<td>1280 × 512 (655,360 pixels)</td>
<td>1280 × 512 (655,360 pixels)</td>
<td>Uncooled (0.02°/m)</td>
<td>30°C to 100°C</td>
<td>30°C to 100°C</td>
<td>30°C to 100°C</td>
</tr>
<tr>
<td><strong>Q-Mode (quantification with the FLIR QL320)</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td><strong>Detector Type</strong></td>
<td>Coated InSb</td>
<td>Coated InSb</td>
<td>Coated InSb</td>
<td>Coated QWIP</td>
<td>Coated QWIP</td>
<td>Coated InSb</td>
<td>Coated InSb</td>
</tr>
<tr>
<td><strong>Zoom</strong></td>
<td>1-8× continuous digital zoom</td>
<td>1-8× continuous digital zoom</td>
<td>1-8× continuous digital zoom</td>
<td>1-6× continuous digital zoom</td>
<td>1-8× continuous digital zoom</td>
<td>1-8× continuous digital zoom</td>
<td>1-8× continuous digital zoom</td>
</tr>
<tr>
<td><strong>Lenses</strong></td>
<td>14.5° (38 mm) or 24° (23 mm)</td>
<td>14.5° (38 mm) or 24° (23 mm)</td>
<td>Standard: 24° (23 mm); Optional: 14.5° (38 mm)</td>
<td>14° (30 mm) or 24° (23 mm)</td>
<td>14° (30 mm) or 24° (23 mm)</td>
<td>14° (30 mm) or 24° (23 mm)</td>
<td>14° (30 mm) or 24° (23 mm)</td>
</tr>
<tr>
<td><strong>Temperature Range</strong></td>
<td>-20°C to 350°C (-4°F to 662°F)</td>
<td>-20°C to 350°C (-4°F to 662°F)</td>
<td>-20°C to 350°C (-4°F to 662°F)</td>
<td>-20°C to 100°C (-4°F to 212°F)</td>
<td>-20°C to 100°C (-4°F to 212°F)</td>
<td>-20°C to 100°C (-4°F to 212°F)</td>
<td>-20°C to 100°C (-4°F to 212°F)</td>
</tr>
<tr>
<td><strong>Detector Type</strong></td>
<td>Cooled InSb</td>
<td>Cooled InSb</td>
<td>Cooled InSb</td>
<td>Uncooled microbolometer</td>
<td>Cooled QWIP</td>
<td>Cooled InSb</td>
<td>Cooled InSb</td>
</tr>
<tr>
<td><strong>Primary Gas Seen</strong></td>
<td>Hydrocarbons (CxHx)</td>
<td>Hydrocarbons (CxHx)</td>
<td>Hydrocarbons (CxHx)</td>
<td>LR lens: methane, nitrous dioxide, propane, sulfur hexafluoride, R-134a and R-152a</td>
<td>LR lens: methane, nitrous dioxide, propane, sulfur hexafluoride, R-134a and R-152a</td>
<td>LR lens: methane, nitrous dioxide, propane, sulfur hexafluoride, R-134a and R-152a</td>
<td>LR lens: methane, nitrous dioxide, propane, sulfur hexafluoride, R-134a and R-152a</td>
</tr>
<tr>
<td><strong>MPEG Recording</strong></td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
<td>RTP/MPEG4 (up to 60 minutes/clip) to memory card</td>
</tr>
<tr>
<td><strong>File Storage</strong></td>
<td>SD card, 14-bit measurement data included</td>
<td>SD card, 14-bit measurement data included</td>
<td>SD card, 14-bit measurement data included</td>
<td>SD card, 14-bit measurement data included</td>
<td>SD card, 14-bit measurement data included</td>
<td>SD card, 14-bit measurement data included</td>
<td>SD card, 14-bit measurement data included</td>
</tr>
</tbody>
</table>

For an overview of the specifications for the FLIR GF77a and GF343 please visit FLIR.com.
INFRARED TRAINING CENTER
The Premier Infrared Camera User Educational & Training Resource

Your professionalism drives you to know everything you can about your business; that’s why you’ll want to get the most out of your GF-Series camera.

FLIR cameras are easy to use and intuitive, but only expert training will give you the knowledge and skills to wring every last bit of capability from your investment. An Infrared Training Center (ITC) certificate is proof of your expertise in operating your camera and interpreting the thermal information it provides.

During the three-day ITC Optical Gas Imaging certification course, you’ll learn how to set up and operate FLIR GF-Series cameras, which gases these cameras can see, and how environmental conditions affect gas leak detection, all while earning 2.0 IACET CEUs. Training includes classroom instruction and lab time covering basic inspection procedures, permitting requirements, safety practices, and more.

For full course descriptions, updated schedules, and more information, visit the itc website at: Infraredtraining.com or call 1.866.872.4647.

ITC COURSES PROVIDE:
• Industry-leading, high-quality interactive instruction
• The most qualified international instructors
• The most extensive hands-on laboratories
• ISO 9001-registered
• Optional online training courses

OTHER ITC COURSES INCLUDE:
• Optical Gas Imaging I and II
• OOOOa Fugitive Emissions Monitoring (U.S. Only)
• Thermography Fundamentals
• General Thermography Primer
• Level I, Level II, and Level III Thermography
• IR Electrical Inspection
• IR Mechanical Inspection

Attend classes at our training center, locally at one of our regional classes, or in your facility with our on-site service.