

OPTICAL GAS IMAGING

INFRARED CAMERAS FOR GAS LEAK DETECTION

MAKE INVISIBLE GASES VISIBLE SAVE LIVES, INCREASE REVENUE

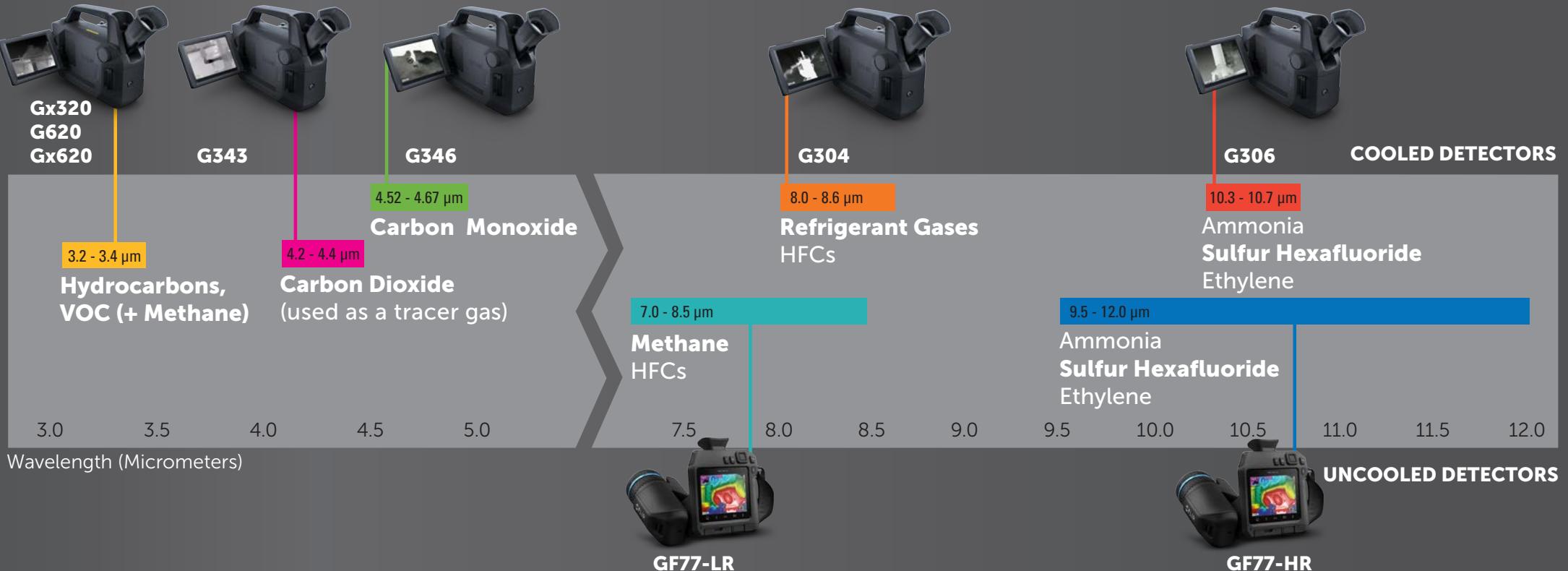
A facility can have thousands of connections and fittings that require regular inspection, but the reality is only a small percentage of these components will ever leak. Testing them all with a traditional “sniffer” takes a great deal of time and effort and may put the inspector in an unsafe environment.



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 G-Series camera, you can document gas leaks that lead to lost product, lost revenue, fines, and safety hazards.

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.

KEY GASES DETECTED BY CAMERA



MAIN INDUSTRY / APPLICATION

Oil and Gas Regulatory Compliance	Utility Hydrogen Leak Detection	Steel Safety & Environmental Stewardship	Oil and Gas Safety & Large Emission Event Detection	Chemical Safety & Environmental Compliance	Utility Environmental Stewardship	Food & Beverage Safety & Productivity
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TRACK LEAKS TO THEIR SOURCE

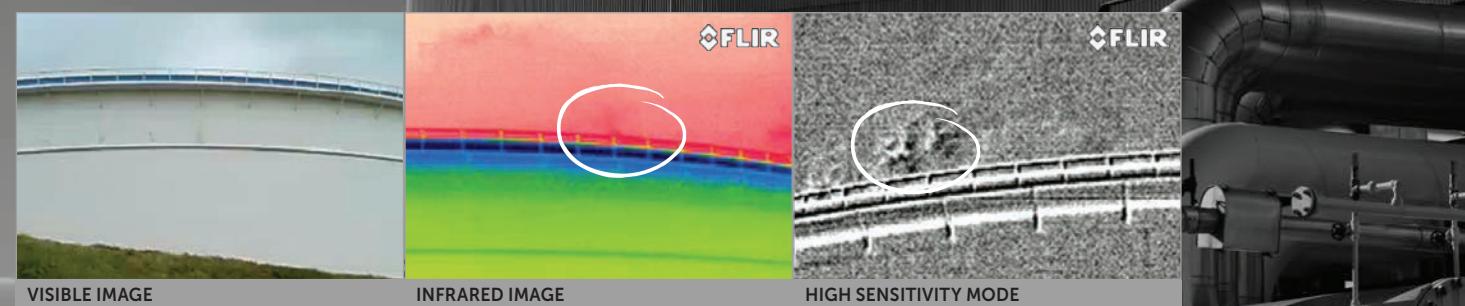
G-Series optical gas imaging cameras can detect natural gas, SF₆, and CO₂ leaks quickly, accurately, and safely without the need to shut down systems, or the need for contact with the components. Gas leaks that are invisible to the naked eye look like smoke on infrared optical gas imaging cameras, making 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



SCAN BROAD AREAS QUICKLY, FROM A SAFE DISTANCE



VISUAL IMAGE

INFRARED IMAGE

HIGH SENSITIVITY MODE

HANDHELD 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 Gx320, G306 and G346 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.

G-SERIES HANDHELD CAMERAS ARE IDEAL FOR:

- Natural gas wellsites
- Electrical substations
- Power generators
- Chemical processing plants
- Manufacturing plants
- 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.



HELPFUL ACCESSORIES

FLEXIBLE SYSTEMS THAT MEET YOUR CHANGING NEEDS

No other thermal imaging camera manufacturer offers a wider range of accessories than Teledyne FLIR. Hundreds of accessories are available to customize our cameras for a wide variety of imaging and measurement applications, including a comprehensive range of lenses, LCD screens, remote control devices, and more.



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



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



VENTING STORAGE TANK PRESSURE RELIEF VALVE



NATURAL GAS LEAK ON COMPRESSOR VALVE



METHANE LEAK AT NATURAL GAS FACILITY SITE





METHANE & HYDROCARBONS

FLIR Gx320™

FLIR G620™

FLIR Gx620™

The FLIR Gx320, G620, and Gx620 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 (G620 & Gx620) and highly accurate temperature measurements, inspectors can assess and improve thermal contrast between the gas cloud and the background.

The Gx320, G620, and Gx620 are verified to meet sensitivity standards defined in the US EPA's 0000a methane rule and meet 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.

HAZARDOUS LOCATIONS

The FLIR Gx320 and Gx620 allow you to quickly detect and visualize fugitive natural gas emissions while maintaining safety inside hazardous locations. These OGI cameras are 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 Gx320/G620/Gx620 DETECT NEARLY 400 GASES, INCLUDING:

- | | | |
|-------------|----------------|------------|
| • Methane | • Pentane | • Toluene |
| • Methanol | • 1-Pentene | • Octane |
| • Propane | • Isoprene | • Heptane |
| • Benzene | • Butane | • Xylene |
| • Ethane | • Ethylbenzene | • Ethylene |
| • Propylene | • MEK | • Hexane |
| • Ethanol | • MIBK | |



THE Gx320, G620, AND Gx620 ARE IDEAL FOR:

- Offshore platforms
- Liquid natural gas shipping terminals
- Oil refineries
- Natural gas wellheads and processing plants
- Compressor stations
- Bio-gas and power generation plants

Gx320 & Gx620: SAFETY ZONE COMPLIANT

At offshore rigs, well sites, and production plants, there's often a risk of gas collecting and igniting with a stray spark or hot surface. Working in these areas requires special clothing and equipment – if it's possible.

The oil and gas industry has long awaited a gas detection solution such as the Gx320 & Gx620, because its hazardous location designation allows the user to work confidently and focus on the job at hand.

THE Gx320 AND Gx620 HAVE THE FOLLOWING CERTIFICATIONS:

- ATEX/IECEx, Ex ic nC op is IIC T4 Gc II 3 G
ANSI/ISA-12.12.01-2013, Class I Division 2
CSA 22.2 No. 213, Class 1 Division 2



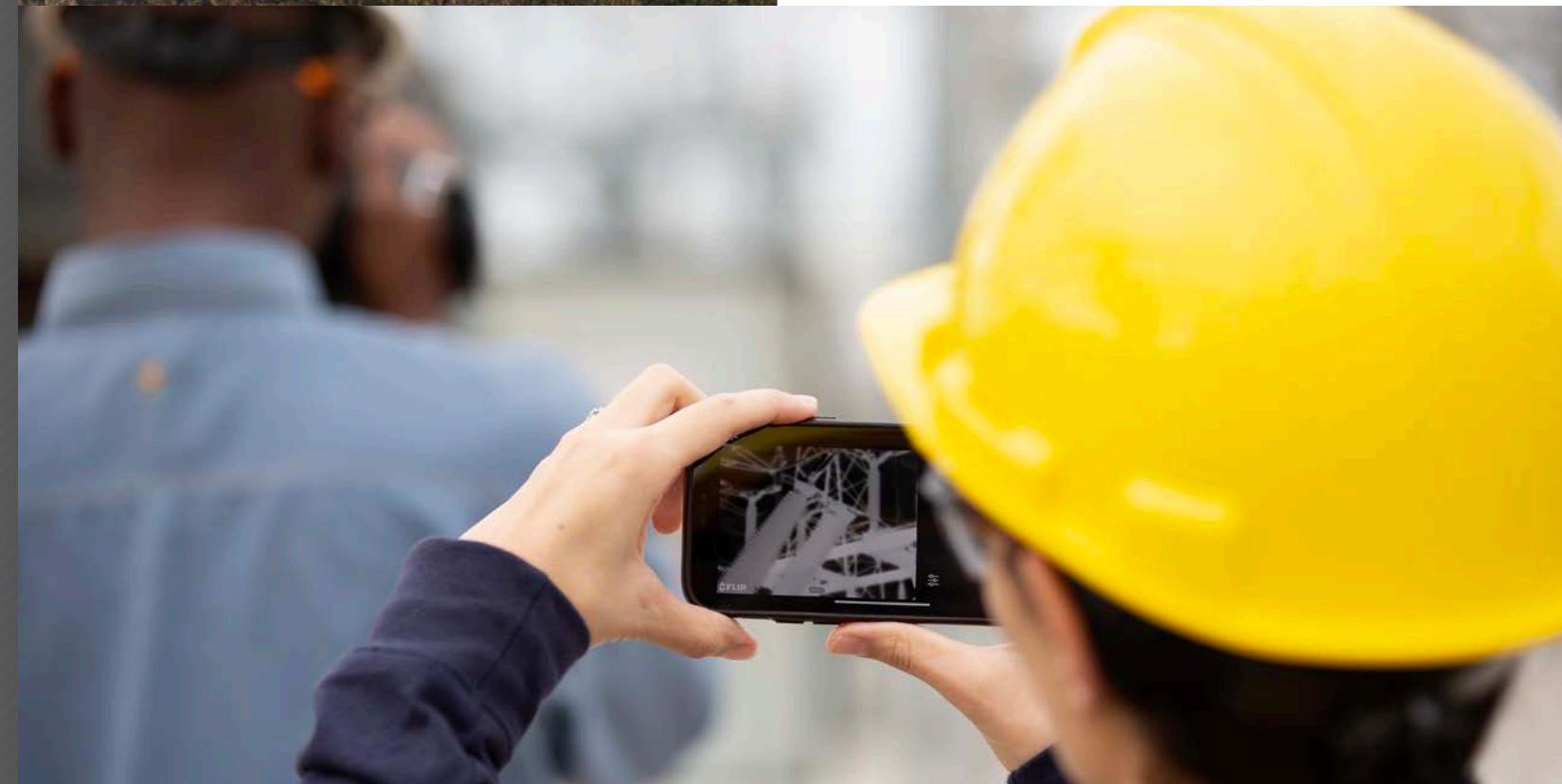
THE MOST ADVANCED GAS VISUALIZATION AND IN-CAMERA GAS LEAK QUANTIFICATION

At Teledyne FLIR, we understand that the work you do is critical and dangerous. That's why we designed the FLIR G-Series to help you do your job safer and more efficiently.

FLIR G-Series OGI cameras bring you wireless connectivity, interchangeable lens options, an ergonomic rotating touchscreen, and in-camera gas quantification* to expand your inspection capabilities.

- Quantify gas leak size and type within the camera, eliminating the need for a secondary device*
- Comfortably inspect from any distance with quick-swap interchangeable lenses
- Streamline the inspection process with Multi-REC (recording mode), which allows you to record across various video types including infrared, high sensitivity mode (HSM), and visual
- Instantly connect to smartphones or tablets with advanced built-in Wi-Fi and Bluetooth®
- Automatically upload and store saved images/videos to FLIR Ignite cloud software while in the field

*Gx320, Gx620, and G620 models only





SPECIFICATIONS

	Gx320	Gx620	G620	G343	G346	G304	G306	GF77
Primary Gas Seen	Hydrocarbons (CxHx)	Hydrocarbons (CxHx)	Hydrocarbons (CxHx)	Carbon dioxide (CO ₂)	Carbon monoxide (CO)	Refrigerants	Sulfur hexafluoride (SF ₆), ammonia (NH ₃)	LR lens: methane, R-134a, R-152a HR lens: sulfur hexafluoride (SF ₆), ammonia (NH ₃), ethylene
Detector Type	Cooled InSb	Cooled InSb	Cooled InSb	Cooled InSb	Cooled QWIP	Cooled QWIP	Cooled QWIP	Uncooled microbolometer
Spectral Range	3.2 μm to 3.4 μm	3.2 μm to 3.4 μm	3.2 μm to 3.4 μm	4.2 μm to 4.4 μm	4.52 μm to 4.67 μm	8.0 μm to 8.6 μm	10.3 μm to 10.7 μm	LR lens: 7 μm to 8.5 μm HR lens: 9.5 μm to 12 μm
Resolution	320 × 240 (76,800 pixels)	640 × 480 pixels (307,200 pixels)	640 × 480 pixels (307,200 pixels)	320 × 240 (76,800 pixels)	320 × 240 (76,800 pixels)	320 × 240 (76,800 pixels)	320 × 240 (76,800 pixels)	320 × 240 (76,800 pixels)
Quantification in Camera	Yes	Yes	Yes	No	No	No	No	No
Thermal Sensitivity	<10 mK at 30°C (86°F)	20 mK at 30°C (86°F)	20 mK at 30°C (86°F)	15 mK at 30°C (86°F)	15 mK at 30°C (86°F)	15 mK at 30°C (86°F)	15 mK at 30°C (86°F)	25° lens: <25 mK at 30°C (86°F) 6° lens: <40 mK at 30°C (86°F)
Accuracy	±1°C (±1.8°F) for temperature range (0°C, to 100°C, 32°F to 212°F) or ±2% of reading for temperature range (>100°C, >212°F)	±1°C (±1.8°F) for temperature range (0°C to 100°C, 32°F to 212°F) or ±2% of reading for temperature range (>100°C, >212°F)	±1°C (±1.8°F) for temperature range (0°C to 100°C, 32°F to 212°F) or ±2% of reading for temperature range (>100°C, >212°F)	N/A	±1°C (±1.8°F) for temperature range (0°C to 100°C, 32°F to 212°F) or ±1% of reading for temperature range (>100°C, >212°F)	±1°C (±1.8°F) for temperature range (0°C, to 100°C, 32°F to 212°F) or ±2% of reading for temperature range (>100°C, >212°F)	±1°C (±1.8°F) for temperature range (0°C, to 100°C, 32°F to 212°F) or ±2% of reading for temperature range (>100°C, >212°F)	±5°C (±9°F) for ambient temperatures 15°C to 35°C (59°F to 95°F)
Noise Equivalent Concentration Length (NECL) [ΔT=10°C, Distance= 1 m]	Methane - 13 ppm-m	Methane - 29 ppm-m	Methane - 29 ppm-m	Carbon dioxide (CO ₂) - 5.6 ppm-m	Carbon monoxide (CO) - 9 ppm-m	-	Sulfur hexafluoride (SF ₆) - 0.3 ppm-m, Ethylene (C ₂ H ₄) - 6.3 ppm-m	LR lens: CH ₄ : <100 ppm × m R-134a: <20 ppm × m R-152a: <100 ppm × m HR lens: SF ₆ : <1 ppm × m C ₂ H ₄ : <20 ppm × m NH ₃ : <20 ppm × m
Minimum Laboratory Leak Rate (MLLR) [known gases]	Methane: 0.6 g/hr Propane: 0.6 g/hr Butane: 0.4 g/hr	Methane: 0.6 g/hr Propane: 0.6 g/hr	Methane: 0.6 g/hr Propane: 0.6 g/hr	-	-	-	Sulfur hexafluoride (SF ₆): 0.026 g/hr Ammonia: 0.127 g/hr	Methane: 2.7 g/hr Sulfur hexafluoride (SF ₆): 0.74 g/hr
Temperature Range	-20°C to 350°C (-4°F to 662°F)	-20°C to 350°C (-4°F to 662°F)	-20°C to 350°C (-4°F to 662°F)	-	-20°C to 350°C (-4°F to 662°F)	-20°C to 250°C (-4°F to 482°F)	-40°C to 500°C (-40°F to 932°F)	-20°C to 80°C (-4°F to 176°F), 0°C to 250°C (32°F to 482°F) 100°C to 500°C (212°F to 932°F)
Available Lenses	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)	24° × 18° (23 mm); 14.5° × 10.8° (38 mm)
Zoom	1–8× continuous, digital zoom	1–8× continuous, digital zoom	1–8× continuous, digital zoom	1–8× continuous, digital zoom	1–8× continuous, digital zoom	1–8× continuous, digital zoom	1–8× continuous, digital zoom	1–6× continuous, digital zoom
Focus	Manual	Manual	Autofocus, manual	Autofocus, manual	Autofocus, manual	Autofocus, manual	Autofocus, manual	Continuous (laser), one-shot (laser), one-shot contrast, manual
Display								
Adjustable Viewfinder	4", 640 × 480 pixel rotatable, touchscreen LCD	4", 640 × 480 pixel rotatable, touchscreen LCD	4", 640 × 480 pixel rotatable, touchscreen LCD	4", 640 × 480 pixel rotatable, touchscreen LCD	4", 640 × 480 pixel rotatable, touchscreen LCD	4", 640 × 480 pixel rotatable, touchscreen LCD	4", 640 × 480 pixel rotatable, touchscreen LCD	Dragontrail® Touchscreen (QVGA), 640 × 480 pixels
Visual Camera w/ Lamp	3.2 MP	3.2 MP	3.2 MP	3.2 MP	3.2 MP	3.2 MP	3.2 MP	5 MP
Laser Pointer	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2 Semiconductor AlGaNP diode laser, 1 mW, 635 nm (red)	Class 2, dedicated button, used in focus and distance measurement
Video Out	HDMI, DVI	HDMI, DVI	HDMI, DVI	HDMI, DVI	HDMI, DVI	HDMI, DVI	HDMI, DVI	DisplayPort over USB Type-C
Certifications								
Hazardous Locations	ATEX/IECEx, Ex ic nC op is IIC T4 Gc II 3 G - ANSI/ISA-12.12.01-2013, Class I Division 2 - CSA 22.2 No. 213, Class I Division 2	ATEX/IECEx, Ex ic nC op is IIC T4 Gc II 3 G - ANSI/ISA-12.12.01-2013, Class I Division 2 - CSA 22.2 No. 213, Class I Division 2	-	-	-	-	-	-
US EPA O000a	Yes	Yes	Yes	-	-	-	-	-
Image Analysis	10 spots, 5 boxes with max/min/average, 1 line, Delta T, measurement corrections	10 spots, 5 boxes with max/min/average, 1 line, Delta T, measurement corrections	10 spots, 5 boxes with max/min/average, 1 line, Delta T, measurement corrections	-	10 spots, 5 boxes with max/min/average, 1 line, Delta T, measurement corrections	10 spots, 5 boxes with max/min/average, 1 line, Delta T, measurement corrections	10 spots, 5 boxes with max/min/average, 1 line, Delta T, measurement corrections	3 spot and boxes in live mode
Annotations	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen	Voice: 60 secs with Bluetooth on still images and video Text from predefined list or soft keyboard on touchscreen
Communication Interfaces	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth via headset, Wi-Fi, HDMI	USB 2.0, Bluetooth, Wi-Fi, DisplayPort
Data Storage	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite	Removable SD card, cloud via FLIR Ignite
File Format	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, MJPEG, MPEG4, H.264, RTRR(.csq)	Standard JPEG, RTRR(.csq)
MultiREC Recording	Record multiple files automatically in customizable order	Record multiple files automatically in customizable order	Record multiple files automatically in customizable order	Record multiple files automatically in customizable order	Record multiple files automatically in customizable order	Record multiple files automatically in customizable order	Record multiple files automatically in customizable order	-
GPS	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS; data logging feature	Location data automatically added to every still image; first frame in video from built-in GPS

For an overview of the specifications for the FLIR GF77a and G300a please visit FLIR.com

FLIR PORTABLE INFRARED AND ACOUSTIC CAMERA SOFTWARE

FLIR helps you work more efficiently and boost productivity with a robust software suite, routing plugins, and cloud storage.

SOFTWARE AND CLOUD SOLUTIONS

FLIR Thermal Studio Pro, FLIR Ignite Cloud storage, and FLIR route management provide the total solution your team needs to streamline inspections, analysis, and reporting.

FLIR Thermal Studio Pro: Build an efficient survey roadmap with the FLIR Route Creator software plugin, then download and run it using the Inspection Route feature on your camera. Once your inspection is complete, bring the images back into FLIR Thermal Studio for processing, analysis, and reporting.

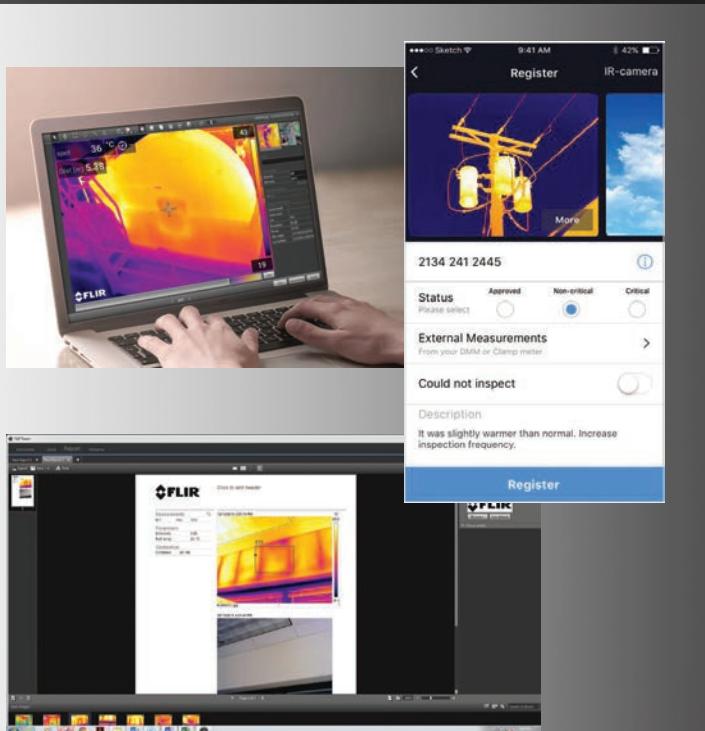
For acoustic imaging, the FLIR Si124 comes with a software plugin for FLIR Thermal Studio Pro that allows you to calculate critical decision-making data such as leak rates, costs, and level of threat from partial discharge.

FLIR Ignite: Upload images wirelessly to this cloud-based service, which automatically manages the safe and secure back-up of your data and instantly shares the content with authorized team members.



FLIR SOFTWARE DEVELOPMENT SOLUTIONS

FLIR's Software Development Kit (ATLAS SDK) allows companies to use their own Computerized Maintenance Monitoring Systems (CMMS) to support read-out of thermal measurements as well as inclusion of METERLINK® data, GPS, compass, and other important parameters embedded within the image.



THE INFRARED TRAINING CENTER

THERMAL AND OPTICAL GAS IMAGING VALUE

The greater your knowledge of thermal and optical gas imaging, the greater the dividends you'll realize for your company and your career. That's why the Infrared Training Center (ITC) offers classes for many industry applications—from free online courses to advanced certification training.

ITC courses include:

- Optical Gas Imaging Certification Course
- OGI Fundamentals Online Course
- Level I, II, and III Thermography Courses
- Electrical Inspection and Level I Electrical Thermography Courses

WORLD-CLASS INFRARED TRAINING

ITC thermography certification courses help prepare you to take a leadership role in an infrared or optical gas inspection program. Level I certifies that you know how a thermal camera or optical gas imager works and how to use it. Level II cranks up your credibility with more in-depth concepts and intensive labs. Level III asserts that you have the knowledge and skills to develop and administer your company's thermography or optical gas imaging program. These certifications offer strong validation to support the work you do.

ITC offers classes at training centers around the globe, at locations within your country, at your company's facility, and even online. On-site training is encouraged if your company needs to certify a group of 10 or more. ITC's on-site training courses are the best way to accommodate a large group on a limited budget. Our instructors will travel directly to your facility to limit your travel costs by keeping staff on site, reducing downtime and short staff issues.

Visit <https://flir.com/ITC-onsite-training> for more information about on-site training. For a complete list of courses and a current schedule, visit infraredtraining.com.



www.flir.com/OGI

For more information contact: Sales@TeledyneFLIR.com
or to find your local support number, visit: flir.com/contactsupport

Specifications are subject to change without notice

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OGI Brochure_022023_RH22-1372

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NASDAQ: TDY

