

# Thermal Camera Application in Gas Detection

## 1 Application Background

Since liquefied natural gas, liquefied petroleum gas and liquefied ethylene are colorless, tasteless and imperceptible to the naked eye, it will easily lead to major accidents such as fire and explosion in case that the gas leakage cannot be found and handled in time. These colorless and tasteless gases make it difficult to detect where the leakage is. In addition, there is a risk of close contact between inspectors and toxic gases. Therefore, special devices are required to detect the location and scale of leakage. Earlier, mechanical probes are used to detect gas leakage, which can not prevent inspectors from harmful gas and carry out real-time all-round detection.

Thermal camera for gas leak can detect a large area in a long-distance and non-contact manner according to the ambient temperature change caused by gas leakage.

Once there is gas leakage, the temperature will be abnormal, which will be displayed as a plume of smoke on the thermal camera. Thus, the visualization of the leaking gas can be realized to help inspectors to locate the leakage position in real time, judge the scale of the gas leakage, and eliminate hidden dangers in a timely manner.

## 2 Application Advantages

### Support gas leakage detection for a variety of gases

Models	G600C	G600F
Detectable Gases	CH <sub>4</sub> , N <sub>2</sub> O, SO <sub>2</sub> , C <sub>6</sub> H <sub>5</sub> OH, C <sub>5</sub> H <sub>8</sub> O <sub>2</sub> , C <sub>11</sub> H <sub>20</sub> O <sub>2</sub> , R13,R13B1,R123,R125,R134A, R417A,R422A,R508A	SF <sub>6</sub> , NH <sub>3</sub> , C <sub>2</sub> H <sub>4</sub> , C <sub>4</sub> H <sub>6</sub> O, C <sub>2</sub> H <sub>3</sub> Cl, C <sub>2</sub> HCl <sub>3</sub> , C <sub>4</sub> H <sub>6</sub> O, C <sub>3</sub> H <sub>6</sub> , C <sub>3</sub> H <sub>4</sub> O, C <sub>3</sub> H <sub>3</sub> N, C <sub>6</sub> H <sub>7</sub> NO <sub>2</sub> , C <sub>3</sub> H <sub>5</sub> F, C <sub>3</sub> H <sub>5</sub> Cl, C <sub>3</sub> H <sub>5</sub> Br, C <sub>4</sub> H <sub>4</sub> O
Thermal camera for gas leak detector can detect various gases such as CH <sub>4</sub> , SF <sub>6</sub> , NH <sub>3</sub> . It is an ideal choice for daily equipment maintenance, accident prevention and protection of atmospheric environment in petroleum, chemical, natural gas, electric power and other industries.		

### Visualized Gas Leakage

Thermal camera for gas leak can detect the temperature change caused by gas leakage and display a panoramic image of the scanned area. Once there is gas leakage, it will be displayed as smoke on the thermal camera, which can help inspectors to see and locate the leakage quickly.

### Long-distance and Non-contact Detection

Traditional gas leakage detection requires contact with gas, and the inspector may be exposed to potentially harmful chemicals. While, thermal camera for gas leakage can carry out non-contact detections, which can effectively avoid the potential health threat of harmful substances to the inspectors.

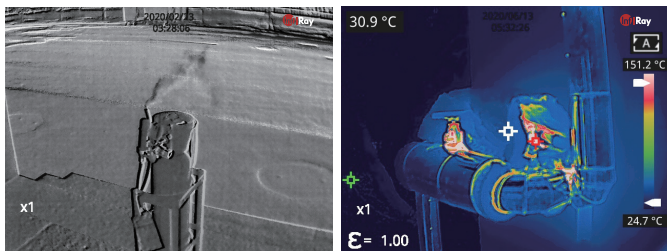
### Support Temperature Measurement to Meet Different Applications

The thermal camera can quickly and accurately obtain the two-dimensional temperature distribution on the surface of equipment and materials, and automatically capture the hottest point in the detection area. Meanwhile, the thermal camera supports point/line/area temperature measurement. It is possible for users to select the temperature measurement targets according to their needs, such as detecting the corrosion, fracture, thinning, blockage and leakage of gas transmission and pipeline, fire-resistance and thermal insulation materials, and various reaction furnaces. Inspectors can visually see the problems and accurately locating them, so as to find out the root cause of the fault reliably and accurately.

### 3 Application Situations

At present, the commonly used gas detectors can only detect the existence of gas leakage, but it is difficult to locate the specific leakage position. It also takes long time to check based on the change of gas concentration. While thermal camera can be applied in gas leakage detection for the below reasons.

- (1) Thermal camera can vividly detected the low temperature caused by gasification in case of natural gas leakage.
- (2) The content of methane in natural gas is generally 85%, and the infrared band is 7.0-8.5 $\mu$ m, which can be displayed by a thermal camera.



#### ▪ Oil and gas exploitation

Thermal camera for gas leakage can be applied in the oil and gas production industry to realize the visualization of gas leakage, locate the gas leakage area in advance, and avoid accidents such as dangerous gas emission. It plays an important role in the prevention and maintenance plan and helps to ensure the safe production of enterprises.

#### ▪ Natural gas transmission and distribution

Natural gas is transported to thousands of households and industrial and commercial users in cities. Due to the explosive nature of gas, gas leakage often causes disastrous consequences. Thermal camera for gas leakage can detect tiny natural gas leaks, and scan the gas pipelines to locate the leakage location, thus ensuring the life safety of users.

#### ▪ Equipment failure detection

Since there are a large number of chemical reactions accompanied by a certain temperature in production, different degrees of corrosion will occur, resulting in the damage or thinning of the moisturizing layer, pipe walls, valves, heat exchangers, and cap linings. With thermal camera, relevant production equipment can be scanned in an all-round way, and abnormal temperature points in the detection area can be automatically captured. Therefore, the inspectors can understand the damage status of the equipment, accurately locate the damaged parts, and take preventive and maintenance measures for the equipment in time. Effectively avoid the occurrence of gas leakage and the loss of energy.

#### ▪ Crude oil refining


A typical refinery includes two types of processes: separation and conversion. The separation process splits crude oil into useful components, which are either sold directly as fuel or used as raw materials for the next process. The conversion process modifies the molecular structure to provide products with appropriate characteristics suitable for mixing with finished fuel. The thermal camera can make outstanding response to the light components and intermediates produced by the fuel processing plant. So thermal camera is ideal for monitoring the volatile gas in the process of crude oil fractionation, which is beneficial to the inspectors in improving the process flow of oil refining and assist the enterprise in efficient production.

#### ▪ Environmental protection law enforcement

CH<sub>4</sub>, SF<sub>6</sub>, NH<sub>3</sub> and other gases can be detected by thermal camera for gas leakage. With the thermal camera, the inspectors of the environmental protection law enforcement department can accurately identify the emission source, detect the emission of relevant gases and substances in the air of the plant, judge whether the environmental quality in the plant meets the standards, in order to ensure its compliance with laws and regulations.

Environmental protection law enforcement

## 4 Recommended Models



**G600**

- Combining gas detection and temperature measurement to meet different applications
- Enhanced gas detection with adjustable gears
- Users can select different targets with measurement point/line/area
- Image modes of DDE, thermal, visible light, PIP and fusion for clearer images
- 3.5-inch touch screen for more details of 640x512 images
- Built-in laser indication for quick target location

## 5 Cautions for Use

- In the gas detection mode, you can set parameters of gas enhancement in the first-level menu and set gas detection gear in the second-level menu to adjust the gas detection effect. After setting the gas enhancement parameter, click any area on the screen to make the setting take effect.
- In the temperature measurement mode, set the temperature measurement gear in the secondary menu to meet different temperature targets.
- When using DDE, PIP, or fusion mode for better dual-light image effect, you need to set the actual distance, that is, the approximate distance between the thermal camera and the object. If the preset parameters cannot meet the requirements, you can also manually perform fusion registration in the settings.