



APPLICATION NOTE

Using Acoustic Imaging to Reduce Costly Leaks in Hospital Oxygen Delivery Systems

Hospital oxygen delivery systems handle massive volumes of gas, making even small leaks potentially costly. Detecting these leaks, particularly the tiny ones that are inaudible to the human ear, has historically been a major challenge for maintenance teams. Acoustic imaging technology now allows hospitals to quickly locate and quantify leaks, improving safety, efficiency, and cost management.



Flir Si2-LD™ Industrial Acoustic Imaging Camera for Pressurized Leak Detection and Mechanical Fault Detection

The Hidden Cost of Small Leaks in Hospital Oxygen Systems

A study of 12 Spanish hospitals in 2018 measured annual medical gas consumption and estimated oxygen use at about 350 cubic metres per bed per year. To put that into perspective, a large hospital of 1,000 beds would consume around 350,000 cubic metres of oxygen per year.

Given these large volumes it's hardly surprising the gas is no longer distributed in individual gas bottles that were employed back in the 1980s but is now delivered to each bed via a comprehensive network of pipes from a bulk storage tank. Invariably these delivery systems contain thousands of joints, allowing pipework to turn corners and move around fixed articles. Any gas travelling under pressure is going to escape through even the slightest leak in such a system. A couple of small leaks won't wreck the budget, but multiplied across thousands of joints, losses could be costly. Even losing 1% of gas through leaks still means losing 3,500 cubic metres of oxygen every year.

The issue for the maintenance engineers is not necessarily making the remedial actions but rather identifying the leaks in the first place. Sizeable leaks are easily detectable but smaller ones, often considered



The Flir Si2-LD acoustic imaging camera helps ensure patient safety while cutting oxygen waste and operating costs.

insignificant, are inaudible to the human ear and therefore usually go undetected.

How Acoustic Imaging Helps Detect the Undetectable

The **Si2-LD** is one of the latest acoustic camera models introduced by Flir, the leading global supplier of thermal and acoustic imaging cameras. Capable of detecting sounds completely inaudible to the human ear, the handheld lightweight portable acoustic camera is able to detect leaks as small as 0.0032 litres per minute from up to 2.5 metres away. Even at a distance of 10 metres it is still capable of detecting leaks of 0.05 litres per minute, meaning that even hard-to-reach areas, such as elevated pipework, can be analysed without having to take ladders or platforms onto a ward. The powerful microphones on the **Flir Si2-LD** are capable of detecting sounds over an extremely wide frequency range, 2 – 130 kHz.

Images captured by the 12-megapixel camera are displayed on a high definition five-inch 1280 × 720 screen, and the 8x zoom feature also allows more distant problem areas to be brought into focus. Dark or hard-to-see areas are no obstacle: the **Flir Si2-LD's** powerful LED lights illuminate components for quick, precise inspection.

Quantifying Losses and Improving Efficiency Across All Medical Gases

While one or two small leaks in a centralised oxygen supply may seem insignificant, the thousands of connecting joints in a system each have the potential to develop leaks over time, resulting in substantial gas loss and serious financial repercussions.

The **Flir Si2-LD** can quantify not only oxygen leaks but also those of other gases, including nitrogen, ammonia, carbon dioxide, and

compressed air — a vital resource used throughout hospitals wherever pneumatic instruments operate. Its on-device software calculates the associated financial losses, giving maintenance teams a clear view of the cost impact of each leak.

Flir's Si-Series acoustic imaging cameras showcase how modern technology can effectively help hospitals identify leaks, reduce oxygen usage, and enhance safety. Interested? Learn more about [Flir Si2-series acoustic imaging cameras](#) or contact your local Flir agent or distributor for a demonstration.



To learn more about acoustic imaging cameras, please visit:
www.flir.com/instruments/acoustic-imaging



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