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Whitepaper: The Invisible Drain

Why Routine Ultrasonic Leak Detection is
Critical for Compressed Air Systems

Executive Summary

Compressed air is often referred to as the "fourth utility." While essential for modern manufacturing and processing, it is also one of the most expensive energy sources in a facility.

This whitepaper by AEFM Limited explores the hidden risks of neglected compressed air systems, demonstrating how even systems that "appear" to be in good order can harbour significant safety risks and financial waste.

The Deception of the Silent System

Many facility managers operate under the "if it isn't broken, don't fix it" mentality. If a compressor is running and the tools are functioning, the system is deemed healthy. However, compressed air leaks are often high-frequency sounds that are inaudible to the human ear and invisible to the naked eye.

Without routine Ultrasonic Leak Detection, a system can lose 20% to 30% of its total capacity to leaks before a single drop in pressure is noticed by operators.

The Dual Impact: Health, Safety, and Finance

1. Health & Safety Implications

Leaks are not merely an efficiency issue; they are a workplace hazard.

- **Acoustic Stress:** High-pressure leaks create constant high-frequency noise which can contribute to worker fatigue and long-term hearing degradation.
- **Projectile Risks:** A small leak can lead to a "pipe whip" or the sudden ejection of debris if a fitting fails catastrophically due to ignored stress.
- **Trips and Falls:** Leaks in pneumatic lines often carry a mist of compressor oil, which can settle on floor surfaces, creating significant slip hazards.

2. The Financial Burden

Compressed air is notoriously inefficient to produce. In a typical system, only about 10-15% of the electrical energy is converted into useful work; the rest is lost as heat. When leaks are present, your compressors work harder and longer to maintain pressure, leading to:

- **Inflated Energy Bills:** Compressors cycling more frequently than required.
- **Premature Equipment Wear:** Increased maintenance cycles and shortened lifespans for expensive compressor units.
- **Reduced Product Quality:** Pressure fluctuations can cause pneumatic machinery to operate out of tolerance, leading to scrapped batches and rework.

Case Study: The £75 Fix vs. The £12,000 Waste

AEFM Limited recently conducted a comprehensive ultrasonic survey for a client whose core operational processing was entirely dependent on a stable compressed air supply.

The Discovery

During the survey, our technicians identified a significant leak in a compressed air bailing machine. To the casual observer, the machine appeared to be functioning correctly. However, the ultrasonic equipment revealed a major internal seal failure.

The Impact

The leak was so severe that it was throwing the entire process kit out of tolerance, leading to intermittent production delays. Upon analysis, the energy waste alone was calculated at over £12,000 per annum.

The Resolution

AEFM technicians isolated the fault and replaced the failing components. The total cost of the repair parts was just £75.

Metric	Impact
Annual Energy Waste	£12,000+
Repair Parts Cost	£75
Return on Investment	Immediate (under 3 days)
Operational Benefit	Restored process tolerance and stability

Conclusion: Proactive vs. Reactive

A "quiet" factory floor does not mean an efficient one. As demonstrated by our recent findings, the cost of a routine AEFM Ultrasonic Survey is a fraction of the potential losses incurred by a single undetected leak.

In an era of rising energy costs and stringent safety regulations, routine ultrasonic detection is no longer an optional luxury—it is a financial and operational necessity.