**Ultrasonic Gas Leak Detection**

Find leaks quickly and easily with Ultrasound technology!

Ultrasound leak detection covers a wide range of leaks: pressure or vacuum and any gas. Sound dependent, ultrasound instruments detect the turbulent flow produced as the fluid (liquid or gas) moves from the high-pressure side to the low-pressure side of a leak. Ultrasound leak inspection is especially beneficial in areas where there is a saturation of gases or where a wide variety of gases, pressurized vessels and vacuum processes exist. For this reason ultrasound leak detection is used in many facilities for safety, environmental, energy or quality assurance programs.

One of the more popular applications for ultrasound is compressed air leak surveys. Utilizing UE Systems patented software for compressed gas leaks users are able to analyse and report on cost reduction while demonstrating the reduction of a plant's carbon footprint.
During a leak, a fluid (liquid or gas) moves from a high pressure to a low pressure. As it passes through the leak site, a turbulent flow is generated. This turbulence has strong ultrasonic components which are heard through headphones and seen as intensity increments on the meter. It can be generally noted that the larger the leak, the greater the ultrasound level.

**Ultrasonic Bearing & Mechanical Inspection**

Inspection of mechanical equipment with ultrasonic instruments such as an Ultraprobe has many advantages. Ultrasound inspection provides early warning of bearing failure, detects lack of lubrication, prevents over lubrication and can be used on all bearing speeds (high, medium and low). In addition, since ultrasound is a high frequency, short wave signal, it is possible to filter out stray, confusing background noises and focus on the specific item to be inspected. Basic inspection methods are extremely simple and require very little training. For those who require more sophistication, UE Systems offers training courses that range from one-day specialized classes to five-day certifiable courses. Ultrasonic condition analysis is straightforward. Users of analog instruments can observe sound levels while simultaneously listening to the sound quality. Digital users have additional options such as both sound and data analysis through specialized software. The more sophisticated digital instruments provide features for comprehensive mechanical or bearing condition monitoring programs including; data logging, software for trending and creation of alarm groups, sound sample recording, spectral analysis of sounds and software with customizable reporting formats.

**How Ultrasound Bearing and Mechanical Inspection Works**

Mechanical movements produce a wide spectrum of sound. One of the major contributors to excessive stress in machinery is friction. Ultrasound instruments detect friction. By focusing on a narrow band of high frequencies, the Ultraprobe detects subtle changes in amplitude and sound quality produced by operating equipment. It then heterodynes these normally undetectable sounds down into the audible range where they are heard through headphones and observed on a display panel for trending, comparison, and analysis. It has been established that ultrasound monitoring provides early warning of bearing failure. Various stages of bearing failure have been established. An 8 dB gain over baseline indicates pre-failure or lack of lubrication. A 12 dB increase establishes the very beginning of the failure mode. A 16 dB gain indicates advanced failure condition while a 35-50 dB gain warns of catastrophic failure. For those who utilize ultrasound spectral analysis, these conditions can often be observed through both FFT and time series analysis.

**Ultrasonic Electrical Inspection**

Ultrasound inspection may be performed at all voltages (low, medium and high). When electrical apparatus such as switchgear, transformers, insulators or disconnects and splices fail, the results can be catastrophic. This is just as true in industrial plants as it is in the power transmission and distribution side. Electrical discharges such as arcing, tracking or, in higher voltages, corona has the potential to create equipment failure and costly downtime. In addition, the problems of RFI and TVI impact on our valuable communication networks. If left undetected, these conditions can become a source of an arc flash incident, which can result in severe injury or death. Arcing, tracking and corona produce ultrasound and are detected with an Ultraprobe.

**How Ultrasonic Electrical Detection Works**

Arcing, tracking and corona all produce ionization which disturbs the surrounding air molecules. An Ultraprobe detects high frequency sounds produced by these emissions and translates them (via heterodyning) down into the audible ranges. The specific sound quality of each type of emission is heard in headphones while the intensity of the signal is observed on a display panel. These sounds may be recorded and analysed through ultrasound spectral analysis software for a more accurate diagnosis. Normally, electrical equipment should be silent, although some equipment such as transformers may produce a constant 60 cycle hum, or some steady mechanical noises. These should not be confused with the erratic, sizzling frying, uneven and popping sound of an electrical discharge.