

# Greenbank Terotech - Systems Division

"The implementation and deployment of specialised products for optimising system performance"



## LA Series Sensor

The LA series sensor has microphone and all amplifier and filtering electronics in one pre-calibrated assembly. The LA202 shown left can be a complete leak detection system; all that is required is a +24 VDC supply. The outputs are both AC acoustic sound and a 4-20mA signal which is the ABSOLUTE decibel level of filtered sound after removal of the unwanted boiler background noise. The sound monitored concentrates on the frequencies of tube leaks.

On the reverse of the assembly can be seen a LED acoustic level indicator, push button self test and a calibration adjustment. The LED gives a visible indication of dB level and confirmation following self-test. These functions are thus available both at the sensor and optional PC control system, giving maximum redundancy and options to power station engineers.

The LA series of sensors have the pedigree of 30 years of leak detection design and application experience, originally developed in the 1970's with the old UK CEBG. It was found that when simulating a steam leak at one side of a boiler, the most sensitive transducer for detecting the white noise given off was the airborne sensor developed by our design engineer of the LA series.

This is because from the white noise from a steam leak, the high frequencies are attenuated heavily in air, but the sound with frequencies just above the boiler

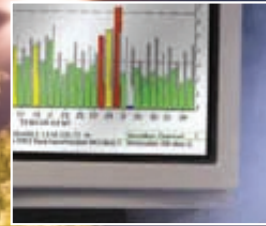
background travel well along the corridors in-between tube banks. The airborne system sensor has a typical listening range up to 45 feet (14 m), with a tube leak (hole) of 0.1 inches (2.5 mm), which can be extended when sound propagates through a tube bank corridor where they are typically located.

The LA202/LA22 true acoustic microphones are very sensitive (60 dB range) and has an absolute calibration, so that the operator can determine where the leak is being produced easily. We offer the air-borne system for all locations where it is possible to do so based on its superior ability to pin-point the location of the leak by comparison of absolute intensity of multiple sensors.

Sensors are typically placed on both sides of a boiler in a box arrangement at a level in-between two rows of tube banks to allow comparison between absolute sound levels making the location of the leak relatively straightforward.

The noise from a steam leak invariably increases with time, while sounds from fans, sprays and mainly soot-blowers vary as they are brought into and out of service. Detecting a leak is a simple matter of monitoring the sound level of each sensor (which has boiler noise filters applied) and trending the absolute sound level and observing the rate of change against time.

The normal background noise of a particular sensor will be 70 - 85 dB (the dB will be vary in different areas of the boiler and will be boiler type dependent). Leaks will generate noise of 90 dB and over, and will continue to rise and can be easily distinguished in-between soot-blowing operations.



## LA Series Sensor

### Fitting and Location

The air-borne sensor arrangement is as shown above, with a 3/4 inch (26 mm) 1 m stub pipe with a 3/4 inch BSP fitting required to be fitted at a convenient point to get the full benefits of the airborne system. Locations such as access doors, gaps in tubing around soot-blowers and often gaps in webbing by cutting fins can be advised by Greenbank for optimum leak coverage.

### Slag, Fouling and Purge Air

An option exists, when deemed that areas are high fouling and slagging, to add air-purge to sensors which are sequentially timed by either optional PC system or plant PLC.

### Self Test and Outputs

Each sensor has a push button self test on the back, which drives the sensor in reverse and outputs a full scale signal. The LED on the back is a sound level indicator which comes on at 74 dB and increases in intensity to around 94 dB, the level of a very probable leak. Each sensor outputs an AC signal for listening to via remote loudspeaker if required, and a 4-20 mA-54-114 dB for input to a PLC for trending to determine leaks and their location.

### Optional PC system

An optional PC system requires only the AC signal and generates the Decibel signal inside the PC to save on cabling from sensors.

Self test, load-speaker, sequential air purge control, trending dB levels, boiler mimic displays and frequency analysis are all available.

### Structure-Borne Sensors

The acoustic structure-borne sensor can be applied to the outside of a boiler without the need for boiler penetration and air purge system, and detects leak type sounds that travel through air and then the 'local' boiler structure. Although not as sensitive, we offer these transducers when there is absolutely no practical way that the superior airborne transducer can be applied to the specific local boiler area. The dynamic range of the sensor is less than the airborne at 30 to 40 dB, with a typical range set to 74-114 dB. However, this sensor can sometimes be located closer to a 'difficult to access' area of interest on the boiler.

### Acoustic Sensors Signal Outputs

**LA202** : 54-114 dB (60dB) = 4- 20 mA DC  
**Airborne** : Remote listening = 0-10 mA AC  
**LA203** : 74-114 dB (40dB) = 4- 20 mA DC  
**Structure** : Remote listening = 0-10 mA AC  
LA22/23 as above minus 4-20 mA for use only with computer based processor.

### Environmental

Sealed to IP68 in single enclosure.  
Normal Temperature range : 0 to 85 deg C.

### Alarms Set Points & Leak Determination

Low/maintenance < 70 dB (boiler dependent)  
Possible leak > 90 dB  
Probable leak > 110 dB

### Electrical Requirements

110V for junction box if used to supply +24 VDC to sensors, or 240 V AC 50Hz for optional computer system.

## The Greenbank Group UK

Incorporating:  
**Greenbank Terotech**  
**Greenbank Materials Handling**  
**GAIM**

Head Office: Hartshorne Road, Woodville, Derbyshire DE11 7GT. United Kingdom

Tel: +44 (0)870 607 8880 Fax: +44 (0)870 607 8889

Web: [www.greenbankgroup.com](http://www.greenbankgroup.com) Email: [info@greenbankgroup.com](mailto:info@greenbankgroup.com)