Noise Terminology Guide

A summary of terms and parameters used in the measurement of noise.

Cirrus Research plc

Welcome
to Noise Measurement

Introduction

Most noise measurement equipment is capable of measuring, recording and storing a wide range of parameters and different types of information about noise. In fact, some of our more advanced instruments can measure and store over 100 different noise parameters at the same time!

This handy little booklet covers the most essential noise terminology, as well as listing all of the parameters that you may see displayed by your Optimus/ Optimus+ sound level meter, Trojan noise nuisance recorder, doseBadge noise dosimeters, or Quantum noise monitor.

There are different versions of all of these instruments and some may not show all of the parameters listed in this booklet.

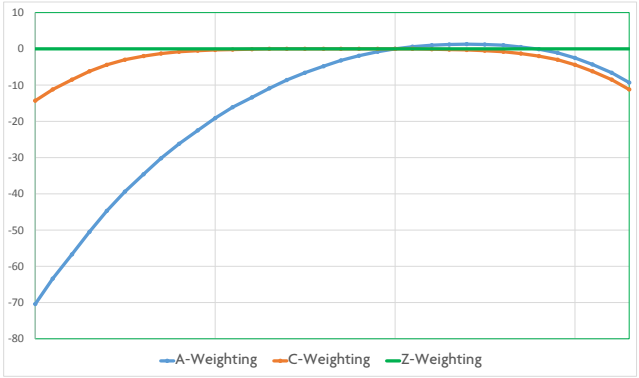
A brief explanation of each parameter is provided along with additional information where appropriate.

If you need a more detailed description of any of the parameters outlined in this booklet, please get in touch with a member of our team and we'll be happy to help.

You can contact us through our website at www.cirrusresearch.co.uk/support, email us at support@cirrusresearch.com or call us on 01723 891 655.

Key Noise Parameters

Term	Description
'A' Weighting	A-weighting is the standard way of weighting the audible frequencies, which is designed to reflect the response of the human ear to noise. The 'A' frequency weighting network is the most widely used, and is used to represent the response of the human ear to loudness. Measurements made with this frequency weighting will be displayed as dB(A) or dBA. For example, as LAeq, LAFmax, LAE etc where the A shows the use of 'A' Weighting.
'C' Weighting	'C' weighting gives much more emphasis to low frequency sounds than the 'A' weighting response and is essentially flat or linear between 31,5Hz and 8kHz, the two -3dB or 'half power' points. In addition, Peak Sound Pressure measurements are made using the 'C' Frequency Weighting. Measurements made with this frequency weighting will be displayed as dB(C) or dBC. For example, as LCeq, LCPeak, LCE etc where the C shows the use of 'C' Weighting.
'Z' Weighting	This has replaced Linear or Flat, and is defined as being a flat frequency response of 8Hz to 20kHz ±1.5dB. Measurements made with this frequency weighting will be displayed as dB(Z) or dBZ. For example, as LZeq, LZFmax, LZE etc where the Z shows the use of 'Z' Weighting.



This graph provides a visual representation of the different frequency weightings. The x-axis represents the frequency; the y-axis represents the attenuation level in decibels. Attenuation, in acoustic terms, is a measure of the energy loss in sound propogation.

Term	Description
Fast, Slow and Impulse Time Weightings	The time weightings of Fast, Slow and Impulse are defined by the standards to which an acoustic measurement instrument is designed, such as IEC 61672. They determine the rate or speed at which instruments respond to changing noise levels. For example, an instrument set to Fast will respond quickly to changes in the noise level, whereas another instrument set to Slow will, by definition, respond more slowly. If the noise level is constant, both instruments will display the same level. An instrument set to Impulse will respond very quickly to an increase in the noise level, but will take much longer to fall when the noise level decreases. Time weightings are only applied to Sound Level, Maximum Sound Level and Minimum Sound Level readings. Also, the Ln percentile levels are calculated from Sound Level, and are therefore also affected by the selected time weighting. Measurement parameters that use these time weightings will reflect it in the way the data is presented. For example, LAFmax. This shows that the values presented are the maximum A-weighted Fast time-weighted sound levels.
Equivalent Continuous Sound Level (Leq)	Leq is the equivalent continuous sound level, and represents the total sound exposure for the period of interest, or an energy average noise level for the period of interest. Leq is often described as the “average” noise level during a measurement, which although not technically correct, is often the easiest way to think of it. If the noise is varying quickly, the average energy over a period of time is a useful measurement parameter. It is for this reason that Leq is often called the equivalent continuous level. Leq values should be written with a frequency weighting, such as dB(A,) along with the measurement duration. For example: LAeq, 5min = 90dB

Term	Description
Peak Sound Pressure	This function is often confused with the Maximum Sound Level, or LMax. Whereas the Maximum Sound Level is the highest level recorded, the Peak level is the physical peak level of the sound wave. The reason for this is that the Maximum Sound Level is the RMS (root mean squared) level with a time weighting (F,S or I) applied. The Peak is the highest point of the pressure wave before any time weighting is applied. The measurement of Peak sound pressure levels is required by the UK Control of Noise at Work Regulations 2005, where it is C-weighted. In this case, the value would be written as LCPeak = 134dB.
1:1 &1:3 Octave Band Filters	When detailed information about a complex sound is needed, the frequency range can be split into sections, or frequency bands. A sound level meter may provide 1:1 (single) octave band filters or 1:3 (third) octave band filters. An octave is a frequency band where the highest frequency is twice the lowest one. For example, an octave filter with a centre frequency of 1kHz has a lower frequency of 707Hz and an upper frequency of 1.414kHz. A third octave band is 1/3 the width of a first octave band. An instrument with 1:1 octave band filters, such as the Optimus+ Red (CR:162C), would typically provide 10 bands, from 31.5Hz to 16kHz. An instrument with 1:3 octave band filters, such as the Optimus+ Green (CR:171B), would typically provide 33 bands, from 12.5Hz to 20kHz, although some additional bands such as 6.3Hz, 8Hz and 10Hz may also be available. Analysing octave band filter data can help in choosing the most appropriate and effective hearing protection. Hearing protection isn't just about safeguarding people against loud noise, but the frequency of the sound must also be taken into account. Octave band data help avoid either under-protection, or over-protection.

Term	Description
% Dose or Dose %	This is the level of noise exposure expressed as a percentage of a fixed level for 8 hours. For example, if the noise limit is 85 dB and a person is exposed to a constant or equivalent sound pressure level of 85 dB for eight hours, then the result is 100% noise dose. In the UK, a 3dB exchange rate, or Q, is used. This means that a noise level of 88dB has twice as much energy as a level of 85dB. Therefore, a constant level of 88dB over eight hours is a 200% dose. The 8-hour average level is known as LEP,d (Daily Personal Noise Exposure) or LEX,8h.
ACGIH	American Conference of Governmental Industrial Hygienists - this is a measurement standard.
C-A	This is the LCeq-LAeq value over a measurement period. Commonly used in determining the most appropriate hearing protection using the HML method.
Criterion Level or CL	This is the maximum Leq sound level allowed for an 8-hour period and corresponds to the 100% noise dose value. Used for calculating % Dose and Estimated % Dose. In the UK this is set to 85dB.
Criterion Time or CT	This the time over which instruments calculate exposure and dose values.
dB(A)	This is the decibel level, A-weighted. This is the most commonly used standard frequency weighting, designed to reflect the response of the human ear to noise.
dB(C)	This is the decibel level, C-weighted. A standard frequency weighting commonly used for the measurement of the Peak Sound Pressure level.

Term	Description
dB(Z)	This is the decibel level, Z-weighted. Z-weighting is a flat frequency response between 10 Hz and 20 kHz ±1.5 dB, excluding microphone response. It replaces Flat and Linear.
Estimated Dose or Est. % Dose	This is the % dose projected forwards over an 8-hour period.
Estimated Exposure	This is the noise exposure projected forwards over an 8-hour period. Also displayed as Est. Exposure.
Exchange Rate (Q)	This is the increase in noise level that corresponds to a doubling of the noise level. LAeq is always based on an Exchange Rate, or Q, of 3. In the US, the exchange rate as defined in the OSHA standard is 5 dB. Using the 5 dB exchange rate, the 8-hour average level is known as TWA or the Time Weighted Average. For other exchange rates, the average level for the measurement duration is known as Lavg.
Exposure	This it the measured noise exposure expressed in Pa2h (Pascal Squared Hours).
Exposure Time	This is the actual time that a person is exposed to noise during a workday - used for the calculation of LEP,d
ISO (EU)	This is a noise standard as set out by the EU Physical Agents (Noise Directive). This affects the threshold level, exchange rate and time weighting, used in the calculation of these values.
L10	This is the noise level exceeded for 10% of the measurement, calculated by statistical analysis.
L90	This is the noise level exceeded for 90% of the measurement, calculated by statistical analysis

Term	Description
LA10	This is the noise level exceeded for 10% of the measurement period with 'A' frequency weighting, calculated by statistical analysis
LA90	This is the noise level exceeded for 90% of the measurement period with 'A' frequency weighting, calculated by statistical analysis
LAE	This is the Sound Exposure Level (SEL) with 'A' frequency weighting. See LE
LAeq	See Leq.
LAeq,1s	This is an A-weighted 1-second Leq value.
LAeq,t	See Leq.
LAF	This is the Sound Level with 'A' frequency weighting and Fast time weighting.
LAF10	This is the noise level exceeded for 10% of the measurement period with 'A' frequency weighting, calculated by statistical analysis from samples of the Fast time weighted sound level.
LAF90	This is the noise level exceeded for 90% of the measurement period with 'A' frequency weighting, calculated by statistical analysis from samples of the Fast time weighted sound level.
LAFmax	This is the maximum Sound Level with 'A' frequency weighting and Fast time weighting during the measurement period.
LAFmin	This is the minimum Sound Level with 'A' frequency weighting and Fast time weighting during the measurement period.
LAFTeq	Takt maximal sound level as defined by DIN 45641.
LAI	This is the Sound Level with 'A' frequency weighting and Impulse time weighting.

Term	Description
LAImax	This is the maximum Sound Level with 'A' frequency weighting and Impulse time weighting.
LAImin	This is the minimum Sound Level with 'A' frequency weighting and Impulse time weighting.
LAS	This is the Sound Level with 'A' frequency weighting and Slow time weighting
LASmax	This is the maximum Sound Level with 'A' frequency weighting and Slow time weighting during the measurement period.
LASmin	This is the minimum Sound Level with 'A' frequency weighting and Slow time weighting during the measurement period.
LAT	See Leq.
LAVG	This is the Time Averaged Sound Level with an exchange rate other than 3dB.
LCE	This is the Sound Exposure Level (SEL) with 'C' frequency weighting.
LCeq,1s	This is the C-weighted 1-second Leq value.
LCeq,t	This is an Leq value measured with 'C' frequency weighting.
LCF	This is the Sound level with 'C' frequency weighting and Fast rime weighting.
LCFmax	This is the maximum Sound level with 'C' frequency weighting and Fast time weighting during the measurement period.
LCFmin	This is the minimum Sound level with 'C' frequency weighting and Fast time weighting during the measurement period.
LCI	This is the Sound Level with 'C' frequency weighting and Impulse time weighting.

Term	Description
LCImax	This is the maximum Sound Level with 'C' frequency weighting and Impulse time weighting.
LCImin	This is the minimum Sound Level with 'A' frequency weighting and Impulse time weighting.
LCPeak	This is the Peak Sound pressure level with 'C' frequency weighting.
LCS	This is the Sound level with 'C' frequency weighting and Slow time weighting.
LCSmax	This is the maximum Sound Level with 'C' frequency weighting and Slow time weighting during the measurement period.
LCSmin	This is the minimum Sound Level with 'C' frequency weighting and Slow time weighting during the measurement period.
LE (SEL)	This is an Leq normalised to 1 second. It can be used to compare the energy of noise events which have different time durations. For example, if a noise level of 90 dB lasts for 1 second, then the LE = 90 dB. If the same noise event lasted 10 seconds, the LE would be 100 dBA. If it lasted 20 seconds, the LE would be 103 dBA and so on. The LE is the Sound Exposure expressed as a logarithm; Leq is the LE divided by time. This will usually be displayed as LAE, LCE or LZE
LEP,d	This is the daily amount of personal noise exposure. Also see LEX,8h. The LEP,d is the average A-weighted noise exposure level for a nominal 8 hour working day. This is also known as the LEX,8h. LEP,d is calculated from the measured sound exposure, the measurement time and the reference 8 hour day.

Term	Description
LEP,w	This is a measure of the total noise exposure received by an employee during a working week. It is similar to the daily noise exposure but is calculated for a 40-hour week (five 8-hour days), instead of an 8-hour day.
Leq	Equivalent Continuous Sound Level This is the most commonly used value used to describe sound levels that vary over time. An Leq is the level that would produce the same sound energy over a stated period of time when using a 3 dB exchange rate. It is defined as the sound pressure level of a noise fluctuating over a period of time T, expressed as the amount of average energy. Commonly written as Leq, LAeq, LAeq,t or LAT.
Leq,t	See Leq.
LEX,8h	See LEP,d.
LleqT	This is the Impulse-weighted Leq,t as defined by DIN 45641.
Lmax	Maximum sound level.
Lmin	Minimum sound level.
Ln	This is the Statistical analysis of noise levels. The n denotes the percentage exceedance, for example the value of L90 shows the noise level that was exceeded for 90% of the measurement duration. The percentile level where 'n' is between 0.01 and 99.9% is calculated by Statistical Analysis. Ln values usually include a descriptor that shows the frequency weighting i.e. A-weighting and the time weighting i.e. Fast. The most common Ln values are LAF10 and LAF90.

Term	Description
Lp	Sound Pressure Level.
Lw	Sound Power Level.
LZE	This is the Sound Exposure Level (SEL) with 'Z' frequency weighting.
LZeq,1s	This is a 1-second Leq value with 'Z' frequency weighting.
LZeq,t	This is an Leq measured with 'Z' frequency weighting.
LZF	This is the Sound level with 'Z' frequency weighting and Fast time weighting.
LZFmax	This is the maximum Sound level with 'Z' frequency weighting and Fast time weighting during the measurement period.
LZFmin	This is the minimum Sound level with 'Z' frequency weighting and Fast time weighting during the measurement period.
LZI	This is the Sound Level with 'Z' frequency weighting and Impulse time weighting.
LZImax	This is the maximum Sound Level with 'Z' frequency weighting and Impulse time weighting during the measurement period.
LZImin	This is the minimum Sound Level with 'Z' frequency weighting and Impulse time weighting during the measurement period.
LZPeak	This is the Peak Sound Pressure Level with 'Z' frequency weighting.
LZS	This is the Sound Level with 'Z' frequency weighting and Slow time weighting.
LZSmax	This is the maximum Sound Level with 'Z' frequency weighting and Slow time weighting during the measurement period.
LZSmin	This is the minimum Sound Level with 'Z' frequency weighting and Slow time weighting during the measurement period.

Term	Description
Maximum Sound Level (Lmax)	This is the Maximum Sound Level, which is the maximum noise level during a measurement period or a noise event.
Minimum Sound Level (Lmin)	This is the Minimum Sound Level, which is the minimum noise level during a measurement period or a noise event.
MSHA	The Mine Safety and Health Administration. This is a United States organisation that has specific guidelines for the measurement of noise.
MSHA EC	The Mine Safety and Health Administration Permissible Exposure Limits. Instruments such as the Optimus/Optimus+ sound level meters have settings, which allow the instrument to calculate the Lavg, TWA, Dose and Est. Dose values in accordance with these regulations. This affects the threshold level, exchange rate and time weighting used in the calculation of these values.
MSHA HC	The Mine Safety and Health Administration Hearing Conservation values. Instruments such as the Optimus/Optimus+ sound level meters have settings, which allow the instrument to calculate the Lavg, TWA, Dose and Est. Dose values in accordance with these regulations. This affects the threshold level, exchange rate and time weighting used in the calculation of these values.
NC	Noise Criteria. This is a single number for rating the sound quality of a room, used extensively by the air conditioning industry, for example, to test the background levels in offices etc. The measured octave bands are compared with the NC curves, which are based on equal loudness curves. The NC rating is the value of the highest NC curve touched by the measured octave bands. The NC Decisive Band is the frequency band touching the NC Curve.

Term	Description
NR	Noise Rating. This is a method for rating the acceptability of indoor environments for the purposes of hearing preservation, speech communication and the reduction of nuisance noise. Sound Pressure Levels measured in octave bands are compared with curves from which a noise rating (NR) is obtained. The NR rating is the highest NR Curve touched by the measured octave band spectrum. The NR Decisive Band is the frequency band touching the NR Curve.
Octave Band Leq,1s	This is when 1:1 octave band filters are shown numerically. No frequency weighting is applied.
Octave Band Leq,t (Graph)	This is when 1:1 octave band filters are shown graphically while the instrument is measuring. The cumulative Leq in each band is shown. No frequency weighting is applied.
Octave Band Leq,t (Numbers)	This is when 1:1 octave band filters are shown numerically with the cumulative Leq in each band shown. No frequency weighting is applied.
OSHA	The Occupational Safety and Health Association. This is a United States organisation that has specific guidelines for the measurement of noise.
OSHA HC	The Occupational Safety and Health Association Hearing Conservation values. Instruments such as the Optimus/Optimus+ sound level meters have settings, which allow the instrument to calculate the Lavg, TWA, Dose and Est. Dose values in accordance with these regulations. This affects the threshold level, exchange rate and time weighting used in the calculation of these values.
OHSA PEL	The Occupational Safety and Health Association Permission Exposure Limits. Instruments such as the Optimus/Optimus+ sound level meters have settings, which allow the instrument to calculate the Lavg, TWA, Dose and Est. Dose values in accordance with these regulations. This affects the threshold level, exchange rate and time weighting used in the calculation of these values.

Term	Description
Pa2h (Pa2h)	This is Noise Exposure in Pascal Squared Hours
Peak	This is the maximum value reached by the sound pressure at any instant during a measurement period (in dB, usually with C frequency weighting).
Percentile Levels (Ln)	This is the Percentage exceeded levels, where 'n' is between 0.1 and 99.9% calculated by statistical analysis. The most commonly used Ln values are L10 and L90 levels.
Projected Exposure	This is the measured LAeq projected over a range of durations to give the equivalent daily exposure values.
Q	See Exchange Rate (Q).
Sound Exposure Level (SEL)	See LE.
Third Octave Band,1s	This is when 1:3 octave band filters are shown numerically. No frequency weighting is applied.
Third Octave Band Leq,t (Graph)	This is when 1:3 octave band filters are shown graphically when the instrument is measuring. The cumulative Leq in each band is shown. No frequency weighting is applied.
Third Octave Band Leq,t (Numbers)	This is when 1:3 octave band filters are shown numerically with the cumulative Leq in each band shown. No frequency weighting is applied.
Threshold Level	A number of occupational noise regulations specify that for the measurement of noise at work, sound levels below a certain limit (the threshold) should be disregarded. These include the OSHA and MSHA regulations commonly used in the USA.
TWA (Time-Weighted Average)	Using a 5 dB exchange rate, this is the total amount of workplace noise exposure expressed as an equivalent standard 8-hour working day. Used by the OSHA specification.

Sound Level Meter Standards & Terms

The table shows the current standards for sound level meters, integrating averaging sound level meters (i.e. those that measure Leq), noise dosimeters and acoustic calibrators, which apply in the UK.

Instrument Type	Current Standards	Superseded Standards
Sound Level Meters	BS EN 61672-1:2013 Also published as IEC 61672-1:2013	BS EN 60651 BS 5569:1981 IEC 60651:1979 (previously known as IEC 651)
Integrating Sound Level Meters	BS EN 61672-1:2013 Also published as IEC 61672-1:2002	BS EN 60804:2001 BS 6698:1986 IEC 804:1985
Noise Dosimeters	BS EN 61252:1997 Also published as IEC 61252:1993	BS 6402:1994 (Previously numbered as IEC 1252:1993 and BS 6402:1994)
Acoustic Calibrators	BS EN 60942:2017 Also published as IEC 60942:2017	BS EN 60942:2003 IEC 60942:2003

Term	Description
Class 1	Precision grade meters for laboratory and field use as defined in IEC 61672. This may also be referred to as Type 1, although the IEC 61672 standard uses the term Class rather than Type.

Term	Description
Class 2	General grade meters for field use as defined in IEC 61672. This may also be referred to as Type 2, although the IEC 61672 standard uses the term Class rather than Type.
Type 1	Laboratory and field-grade for sound level meters defined in standards such as IEC 60651 and IEC 60804. These standards have been superseded by IEC 61672, which uses Class 1 rather than Type 1.
Type 2	General field-grade for sound level meters defined in standards such as IEC 60651 and IEC 60804. These standards have been superseded by IEC 61672, which uses Class 2 rather than Type 2.
IEC	International Electrotechnical Commission This is the international standards body responsible for issuing technical standards for instrumentation, such as the IEC 61672 standard for sound level meters.
IEC 60651	A standard for Sound Level Meters, now superseded by IEC 61672. In the UK this was known as BS EN 60651.
IEC 60804	A standard for integrating and integrating-averaging sound level meters, now superseded by IEC 61672. In the UK this was known as BS EN 60804 and previously BS 6698.
IEC 61652	The international standard for personal sound exposure meters or noise dosimeters. In the UK this is known as BS EN 61252. The standard for noise dosimeters has no Class or Type levels.
IEC 61620	The International standard for 1:1 octave & 1:3 octave band filters.
IEC 61672	The International standard for sound level meter and integrating averaging sound level meters, which has superseded both IEC 60651 and IEC 608.

Term	Description
IEC 651	An international standard for sound level meters, replaced by IEC 60651 and now superseded by IEC 61672.
IEC 804	An international standard for integrating averaging sound level meters, replaced by IEC 60651 and now superseded by IEC 61672
IEC 60942	The international standard for sound calibrators (acoustic calibrators).
IEC 942	An international standard for acoustic calibrators. Replaced by IEC 60942.
DIN 45641	German standard that defines the additional measurements LAFTeq & LIeqT.
ISO	International Standards Organisation. An international standards body that issues measurement standards such as ISO 1996 for environmental noise and ISO 20906 for aircraft noise.

Other Noise Terminology

There are a number of other terms that are used when we discussing noise measurement. This section covers some of the more common ones.

Term	Description
Acoustic Calibrator	An instrument that provides a reference noise source that is used to calibrate and check the performance of a noise measurement instrument.
Broadband	Noise measurements using parameters, which include all audible noise, such as dB(A) and dB(C).
Calibrated to	The level to which a noise measurement instrument has been calibrated. This will usually be 93.7dB in the case of the Optimus/Optimus+ sound level meters and 114dB in the case of the doseBadge noise dosimeters.
Calibration	The process of determining the accuracy of your measurement chain.
Calibration Offset	The difference between the expected calibration level set in the instrument and the level measured by the instrument during calibration.
CE Mark	A label used to show that an instruments conforms to the specification of a European Directive.
Decibel (dB)	The Decibel is a unit used to measure the intensity of a sound or the power level of an electrical signal by comparing it with a given level on a logarithmic scale. In the case of noise measurement, the measured sound pressure, p (in Pascals) is compared to a reference value p0 of 2x10-5 Pa using the equation: $dB = 20\ x\ log_{10}\left(\frac{p}{p_0}\right)$
Data Logging	The storage of measurement information into a sound level meter or noise dosimeter that can be downloaded into software on a PC such as NoiseTools.

Term	Description
Dynamic Range	All noise measurement instruments are limited in the range of levels that they can accurately measure by inherent noise at low levels and by overload at high levels. The usable region between these two is the dynamic range of the instrument, expressed in dB.
Free Field Microphone	At frequencies above 1 kHz, the wavelength of sound is small enough for a standard half-inch microphone to 'disturb' or affect the sound field being measured. Free field microphones are designed to compensate for this effect.
Integrating Averaging Sound Level Meter	A sound level meter that accumulates the total sound energy over a measurement period and calculates an equivalent average value, usually displayed as Leq.
Microphone Capsule	The microphone capsule is the part of the noise measurement instrument that converts the acoustic pressure, or noise, into an electrical signal that can be measured and displayed by the instrument. This is often the most sensitive and fragile part of a noise measurement instrument as it has to deal with both very small and very large changes in pressure, with great accuracy and precision.
Noise Floor	The lower limit of measurement capability of an instrument, calculated from the addition of all noise sources and unwanted signals within a measurement system. Signals beneath the noise floor cannot be measured.
Overload	The input to the sound level meter is too high for the current measurement range.
Pa	Pascal. This is the SI derived unit of pressure.
Preamplifier	The preamplifier is an electronic circuit, which takes the electrical signal from the microphone capsule and converts it into a signal that can be used in the sound level meter.
Sound Level Meter	An instrument for measuring various noise parameters.

Term	Description
Sound Power Level	This is a logarithmic measurement of the sound power as a relation to the threshold of hearing, and makes the values more manageable i.e. 0 to 160 dB and the symbol is Lw.
Sound Pressure Level	SPL, or sound level Lp, is a logarithmic measurement of the RMS sound pressure of a sound, relative to a reference value. It is measured in decibels (dB).
Statistical Analysis	A calculation performed by a sound level meter on the noise levels measured during a measurement period, to describe the statistical spread of the noise. The resulting statistical levels, of Ln values, are displayed in dB.
Third Octave Band	A frequency band whose cut-off frequencies have a ratio of approximately 1.26. The cut-off frequencies of 891 Hz and 1112 Hz define the 1000 Hz third-octave band in common use. In modern sound level meters, 1:3 or 1/3 octave band filters are usually available from around 12.5Hz to 20kHz although some instruments may also provide lower bands.
Time Constant	A standardised time constant used in exponential time weighting for acoustical analysis. The standard time constants for sound level meters are Slow (1000ms), Fast (125ms) and Impulse (35 ms while the signal level is increasing or 1,500 ms while the signal level is decreasing).
Time History Rate	The speed or rate at which noise levels are sampled and stored in the instrument. These samples, or time history, can be downloaded to software, such as NoiseTools, and displayed on a graph.
Tonal Noise Detection	A feature available on certain sound level meters, including the Cirrus Optimus/ Optimus+, that allows tonal noise according to ISO 1996-2:2007 Simplified method (Annex D) or the Cirrus Improved Method.
Under Range	The input to the sound level meter is too low for the current measurement range.

Cirrus Noise Measurement Equipment

Below is an overview of the different types of noise measurement equipment, available to buy or rent from Cirrus Research, along with their different uses.

Product Type	Product Name	Application
Entry-Level Sound Meter	CR:308 / CR:310	Basic noise level testing. Fire alarm testing.
Basic Sound Level Meter	Optimus/Optimus+ Yellow	Basic noise measurements. Initial noise level investigations.
Sound Level Meter for Occupational Noise	Optimus/Optimus+ Red	Health and safety regulation compliance in all industries.
Sound Level Meter for Environmental Noise	Optimus/Optimus+ Green	Noise pollution control for all industries.
Noise Dosimeter for Heavy-Duty Environments	doseBadge MK4 / Industrial doseBadge (CR:110A / CR:112A)	Health and safety regulation compliance in industries such as construction, demolition, manufacturing, engineering etc.
Noise Dosimeter for Professional Environments	doseBadge[5] (CR:120A)	Health and safety regulation compliance in industries such as entertainment (theatres, pubs and clubs etc.), emergency services, schools, offices etc.
Noise Dosimeter for Environments with Potentially Explosive Atmospheres	IS doseBadge (CR:110AIS / CR:112AIS)	Health and safety regulation compliance in industries such as mining, petro-chemical, food manufacturing etc.
Cloud-Based Noise Monitoring System	Quantum	Indoor noise monitoring across one site/multiple sites in industries such as construction, entertainment, manufacturing etc.

Product Type	Product Name	Application
Noise Nuisance Recorder	Trojan2 / Trojan^{LITE}	Local government and housing associations investigating nuisance noise complaints from residents.
Fixed-Position Environmental Noise Monitor	Invictus	Environmental noise monitoring in industries such as construction, aviation, manufacturing, logistics etc.
Portable Environmental Noise Monitor	Optimus Outdoor Measurement Kit	Environmental noise monitoring for short-term projects such as music festivals, ad-hoc monitoring etc.
Integrating Noise Monitoring System for Environmental Noise	Galactus	Where environmental noise monitoring needs to be added to an existing monitoring system. Ideal in industries such as aviation, construction etc.
Noise Sensor for Occupational/ Environmental Noise	MK:427 NoiseSensor	Where noise monitoring needs to be added to an existing monitoring system. Noise level is converted to an electrical signal that is read by an existing system. Ideal for all industries.
Noise Sensor for Environmental with Potentially Explosive Atmospheres (North America Only)	MK:440 NoiseSensor^{NI}	Where noise monitoring needs to be added to an existing monitoring system. Noise level is converted to an electrical signal that is read by an existing system. Ideal for North American industries that require a non-incendiary instrument.
Measurement Kit for Vehicle Noise	Optimus VNK (Vehicle Noise Kit)	Vehicle exhaust noise regulation and motorsport regulation compliance.
Noise-Activated Warning Sign	SoundSign / AWSoundSign	Providing a visual indicator for when noise levels reach a pre-set level in all industries and workplaces.
Noise Data Analysis Software	NoiseTools	Downloading and analysing noise data from Cirrus instruments, and creating reports based on that data.

Cirrus Research Contact Details

If you need to contact Cirrus Research to find out more about noise measurement, purchase noise measurement equipment, or for technical support, you can reach us on the details below.

UK Equipment Sales, Equipment Hire, Equipment Calibration, Training, and Worldwide Sales

Telephone: 01723 891655

Email: sales@cirrusresearch.com

Website: www.cirrusresearch.co.uk

Address: Acoustic House, Bridlington Road, Hunmanby, North Yorkshire, YO14 0PH, United Kingdom

France Equipment Sales, Equipment Hire, and Equipment Calibration

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