

NoiseMeters

dBadge2

Noise Dosimeter

Making personal noise
exposure measurements
simpler than ever before



dBadge2

The dBadge2 noise dosimeter is the ideal tool for a variety of workplace noise assessments and campaigns, with the added benefit of wireless connectivity that will increase confidence and productivity.

Applications

- Complete shift exposure measurements
- Task based measurements
- Measurements in accordance with CFR 1910.95 (USA), ISO9612:2009, L108 Controlling Noise at Work.
- Identification of noise sources
- Selection of hearing protection

Key Features

- Bluetooth® 4.0 wireless connectivity
- Airwave App for Mobile devices such as phones and tablets
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- Full color display
- Motion Sensor
- 1 second time history profiling
- Pause function
- Recording of audio events (optional)
- Octave band analysis (optional)



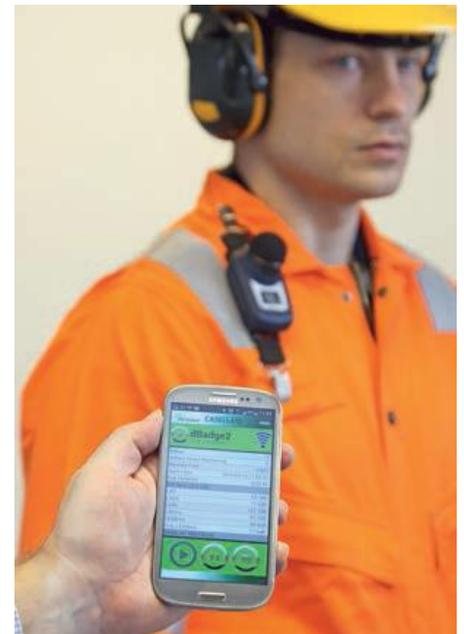
Noise induced hearing loss (NIHL) remains one of the leading causes of occupational disease and it is estimated that 16% of global hearing loss is due to occupational noise exposure. It is particularly acute in the mining, construction and oil & gas sectors plus a wide variety of industrial manufacturing activities where the cumulative effects of noise exposure can lead to irreversible yet avoidable hearing damage.

Noise exposure measurements using a personal noise dosimeter is one recognized method of exposure assessment to the requirements of US regulation CFR 1910.95, International standard ISO9612:2009 Determination of occupational noise exposure and UK Guidance document L108 Controlling Noise at Work plus many other National regulations and standards.

The iconic, original dBadge® proved an invaluable tool in monitoring personal exposure but dBadge2® represents the next generation, building on well established must-have features and usability; a true evolution.

Noise exposure metrics can be confusing given the plethora of parameters required to satisfy an equally wide range of standards but the dBadge2 has been specifically designed to simplify the whole process.

Like its predecessor, the dBadge2's concept is to capture every possible noise exposure related parameter during a measurement run and make it available for subsequent download and analysis. The user only has to choose the most relevant parameters to display on screen.



“You can't manage what you don't measure”

dBadge2



Get Connected

Bluetooth wireless with **Airwave** app.

Monitor multiple devices at once

Monitor your workforce without disturbing

For critical tasks or inaccessible areas



Large, easy to use display



Check your work environment to form a hearing conservation strategy

Summary data with photos and notes can be emailed for inclusion in reports



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“Ability to monitor the device remotely without the need to interfere with or disturb the worker”

Get Connected!

Getting workers to participate in your survey may already be a challenge so the addition of Bluetooth® 4.0 wireless connectivity with the supporting Airwave App allows you to remotely start, stop or pause a measurement run, monitor battery life and memory capacity, check measurement progress and alarms without having to disturb the worker who may be involved in a critical task or be otherwise inaccessible!

Being able to see results in this way brings added confidence that your survey is progressing as planned and therefore minimizes the likelihood of having to repeat a measurement and therefore maximizes your productivity particularly if you have a number of dBadge2 deployed.

“Collecting field data and making notes is much easier”

Connectivity brings other benefits when it comes to collecting data in the field. Summary data, along with a photograph of the task plus on the spot notes can be emailed to yourself or a colleague for review or inclusion in a report.

Multiple Dosimeters

The dBadge2 has a ‘multiple simulated dosimeter’ capability to display noise exposure results according to differing regional or international protocols.

These ‘simulated dosimeters’ termed D1, D2 and D3 simply define the measurement parameters that are displayed on screen or that appear on the Airwave App. The primary dosimeter, D1, provides access to any LAVG or LEQ based noise dose parameters plus a comprehensive set of related noise measurement parameters. There are pre-defined ISO, OSHA, MSHA, and ACGIH setups (selectable from the dBadge2 itself) but also a fully custom configured mode using Casella Insight data management software.

Dosimeters D2 and D3 allow you to display additional LAVG based noise dose results based upon their associated Threshold (T), Criterion (C) and Exchange rates (or Q factor). As an example, you may wish to simultaneously compare noise exposure data based upon the OSHA Personal Exposure Limit (PEL) or Hearing Conservation (HC) setups.

For every measurement run, dBadge2 records a comprehensive data set which means that you can retrospectively analyze the results to whatever standards or parameters you need within Casella Insight data management software, regardless of what D1, D2 or D3 displayed on screen meaning you never need to worry about having the wrong setting and missing a measurement opportunity.

Display

- Color-coded data and alarms
- Aids data interpretation in the field
- Alarms shown on Airwave App

The dBadge2 takes full advantage of the OLED display by color-coding both the D1, D2 and D3 data to aid review in the field but also an ability to define color coded alarm values.

These alarms are based on up to two sources (LAS, LAeq, LCPk, LZPk, LAVG, TWA, Projected TWA, LEPd, Projected LEPd, LEX8h, Projected LEX 8h) with both lower and upper trigger levels specifiable for each alarm.

When a data parameter has been specified as an alarm source, the parameter is shown in green font for levels below the lower limit.

Above the lower and upper trigger levels the alarm parameter is displayed using amber and then red colored fonts respectively. Used in conjunction with the ‘large font’ mode, where just one main parameter is displayed, makes it a valuable tool in the field when the Airwave App cannot be used.



A high visibility blue LED flashes at a slow rate when a lower level exceedance is active and at a fast rate whenever an upper level alarm has been triggered.

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Motion Sensing

- Built-in motion sensor
- Motion index expressed in % of time
- Measurement confidence

Worker engagement in the survey is essential to a successful outcome but in extreme cases a worker may remove the dBadge2 without your knowledge rendering the results invalid. A built-in motion sensor expresses the worker's movement as a percentage of time motion has been detected during a measurement run. Armed with this data you can choose to accept or reject the measurement run.

Audio Recording Option

Available on Plus and Pro models and enabled/disabled in the dBadge2 configuration menu, the audio recording option offers the ability to store 15 seconds of voice notes when a measurement run is started, simply controlled using the left and right hand buttons. Recording the employees name and the task for example adds valuable information for audit purposes.

It also provides the facility to record the actual noise associated with triggered events as defined by user settable exceedance and parameters based on 1 second SPL or LPeak or LMAX profile data. The resulting audio saved in a .WAV file may be subsequently reviewed in Casella Insight data management software.

Octave Bands

Available on the Pro model only, real-time octave band frequency analysis, once the preserve of a hand-held sound level meter, gives the specialist yet more information on which to base their all-important control measures. Similarly enabled/disabled in the configuration menu, overall cumulative instantaneous, LEQ and LMAX values are displayed for the measurement run both on screen in graphical format, with an on-screen cursor and in a table format in the Airwave App.



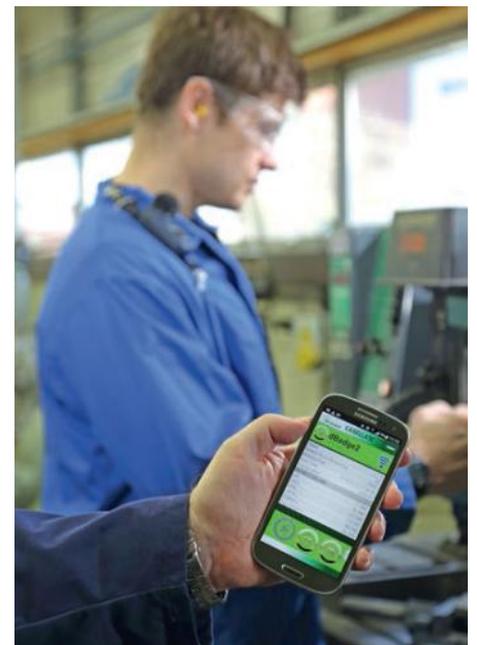
Docking & Charging

The combined docking station and charger allows an individual dBadge2 to be downloaded via USB either using the Utility provided which downloads the dBadge2 data directly to XLS format or directly into Casella Insight Data Management Software using the dBadge2 plug in.



When placed in any of the three 'pockets' the dBadge2 will also begin to charge the battery displaying it's charge status in terms of % charge and projected run time (based on how the dBadge is configured). To check progress, simply press either key or tilt the docking station to 'wake' the dBadge2. A complete charge from empty will take 6 hours, whilst a charge sufficient to conduct an 8 hour survey will take just over an hour.

Up to 12 dBadge2 can be charged in this way using a master Docking Station and extension units.



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INSIGHT Software

- Custom Configure dBadge2
- Store results in a simple tree structured format by person, place and process
- Automatically color code results for noise action level exceedance
- Graphical display and analysis of noise time history
- 'Multitrack view' of events, pauses, exclusions and modifications, notes and motion
- Fast report generation
- Data can be exported to other applications

dBadge2 can be custom configured by and downloaded to PC using the Docking Station and Casella Insight Data Management Software. Once downloaded, data can be stored under a worker's name, location or process so that a database of noise exposure can be built up.

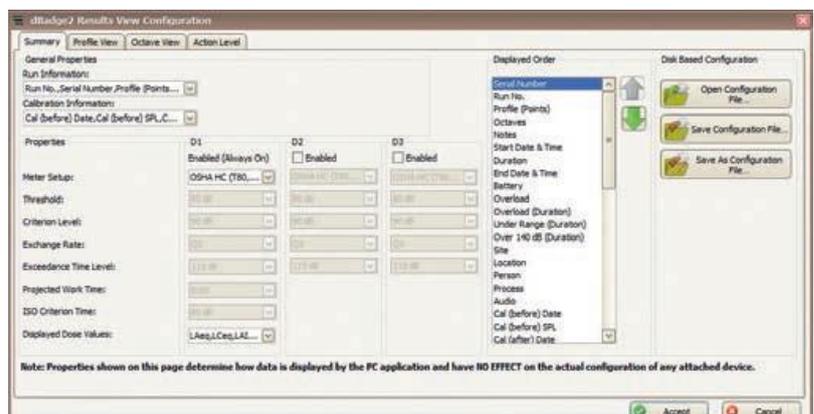
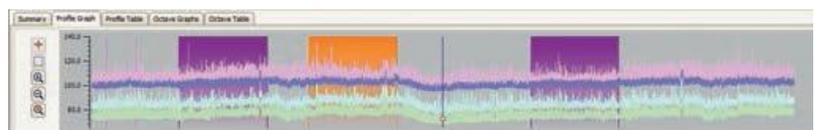
A color coded system can be used to highlight workers who have been exposed to specific action levels. Graphs can be modified by adding exclusion zones, which subsequently provides exposure data with and without these zones.

Data can also be viewed according to different measurement protocols e.g. either ISO or OSHA or alternatively the data can be customized to a user's own requirements.

Furthermore, a multi-track approach to displaying time history, events, pauses, exclusions and modifications, pauses, notes and motion saves time when analyzing data because it allows you to view all the data tagged to the same time-line e.g. view profile data, listen to an audio file associated with an event (PLUS & PRO models) or read/write descriptive notes.

Reports can summarize the required dose data and any information about the worker's working day, together with the time history and other 'tagged' data. To create (or tailor) a report, simply

select the view icon to select your personal report template and it's just a one button press to generate a report. As an audit trail original and modified data can be specified.



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Measurement Kits and Models

dBadge2 is available as a complete starter kit with everything you require to get you up and running. A kit includes the dBadge of your choice; Standard, Plus or Pro, a CEL-120/2 Acoustic Calibrator, 3-way combined Docking Station and charger, universal mains power supply, USB cable and the download software, all housed in a kit case.

Order Codes

DB2Kx
DB2PLUSKx
DB2PROKx

Where x indicates the number of dosimeters in the kit.



Typical Noise Measurement Kit

	<i>dBadge2</i>	<i>dBadge2 PLUS</i>	<i>dBadge2 PRO</i>
H-M-L (C-A)	•	•	•
Programmable delay timer	•	•	•
Fixed run timer	•	•	•
Pause function	•	•	•
Wireless*	•	•	•
Time History	•	•	•
Audio Recording		•	•
Octave Band Filters			•

*Bluetooth 'Smart' Wireless can be disabled using the USB utility App

Ordering Information

The dBadge2 Noise Measurements kits **DB2Kx**, **DB2PLUSKx** and **DB2PROKx** include everything you need to make noise measurements, download them and complete your workplace noise assessment.



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Technical Specifications

Standards	ANSI S1.25:1991 R2007 IEC 61252 Ed 1.1 (2002-3)
Linear Operating Range	55.0-140.3 dB (A) RMS
Dynamic Range	96dB
Peak Range	90.0-143.3dB (C or Z weighted)
Sound Exposure Range	0.0- 6,100.0 Pa ² Hours 0.00 – 22,000,000.00 Pa ² Sec 0.0-100,000.0% Dose
Frequency Weightings	A, C and Z, Type 2
Time Weightings	Fast, Slow and Impulse
Exchange Rate	Q=3 or Q=5
Threshold	70-90dB in 1dB steps (set via Insight software)
Criterion Level	70-90dB in 1dB steps (set via Insight software)
Real Time Clock	Accuracy better than 1min per month
Under Range Indication	1dB below bottom of the range
Overload Indication	140.4dB RMS
Peak Overload Value	143.4dB Peak
Stabilization Time	<3 seconds after power up
Operating Temp. Range	0°C to 40°C (for < ±0.5dB error limit) -10°C to 50°C (for < ±0.8dB error limit)
Ambient Pressure Range	<±0.5dB over 85 to 112kPa
Humidity Range	<±0.5dB over 30% to 90% non- condensing
Storage Temp. Range	-10°C to 50°C
Battery	Internal NiMH, 800mAH
Run Time	Typically 35 hours in broadband mode Typically 15 hours in octave mode
Charge Time	<6 hours from fully discharged
Max Run Duration	24 hours
Max Number of Runs	100
Storage Capacity	Internal USD Flash memory - 300 hours of run data (including 1 second profile data) and up to 90 minutes of event audio recording.
PC Interface	USB 2.0 12Mbps via Docking Station.
Dimensions	85L x 54W x 55H mm, 117g
I.P. Rating	IP65

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Stored Data Sets

The dBadge2 simultaneously records and computes all noise data for every measurement run. The comprehensive set of data containing all of the below parameters is available to view and analyze within the Casella Insight PC application or using the download utility. The Dosimeter Setups D1, D2 and D3 define which parameters are displayed on the instrument itself but all values are automatically stored in the memory of the dBadge2 for download.

L _{AVG} TWA (8hr)	Projected TWA 8hr	
Dose %	Proj Dose %	
L _{AEQ} LEPd / LEX,8h	L _{CEQ} Proj LEPd / LEX,8h	L _{AIEQ}
L _{Apk} + Time	L _{CPk} + Time	L _{ZPk} + Time
PA ² Hrs	PA ² Secs	
ISO Dose% (using ISO Criterion level)		
ISO Proj Dose% (using ISO Criterion level)		
Projected Exposure Points (using ISO Criterion level)		
Exposure Points (using ISO Criterion level)		
Exceedance time (LAS > Exceedance level)		
HML (LC-LA)		
L _{Cpk} >135 (count)	L _{Cpk} >137 (count)	L _{Cpk} >140 (count)
L _{AFmx} + Time	L _{AFmin} + Time	
L _{ASmx} + Time	L _{ASmin} + Time	
L _{Almx} + Time	L _{Almin} + Time	
LAE		
Cumulative Motion Index (expressed as % motion detected).		

Profile "Time History" Data Sets

Time-history data is saved at an interval of once a second for every run and is available following download:

L _{Cpk}	L _{Zpk}
L _{Aeq}	L _{Ceq}
L _{Avg} (Q5, T=0)	L _{Avg} (Q3, T=0)
L _{AFmx}	L _{ASmx}
Motion Index (0/1 status of motion detection)	

Audio events recording (Plus and Pro Model Only)

Settable level will trigger the recording mode which provides an 8kHz sampling rate in a 16 bit compressed .WAV format. Playback is via the Casella Insight PC application or other media player. Each audio event will record for 10 seconds and includes a 3 second pre-trigger buffer to aid identification of the start of the noise event. Audio event trigger sources include LAF, LAS, LCPk, LZPk.

Audio Notes (Plus and Pro Model Only)

Optional audio note of up to 15 seconds attached to each measurement run.

Octave Analysis (Pro Model Only)

Nine octave bands 31.5Hz to 8 KHz, A or Z weighted LEQ (nHz) and LMAX(nHz) cumulative data is saved for each run. Fast or Slow time constant can be selected for LMAX.

Bluetooth Connectivity

All models support wireless connection via Bluetooth® 4.0 (Low energy or Smart).

TX power:	0 dBm to -23 dBm
Receiver sensitivity:	-93 dBm
Range:	Typically 25m line-of-sight, depending on local RF conditions.

Display

96x64 dots full color OLED display with adjustable contrast.

User Control

Two button operation. Remote Start/Stop/Pause using Airwave App.