

Pocket Guide to Visual Alarm Device Design and Application



**apollo**

Introduction

Apollo has developed a range of addressable loop powered products which cover all three Visual Alarm Device categories “Wall”, “Ceiling” and “Open” that are fully certified to EN 54-23.

In situations where power consumption on the loop is an issue, Apollo’s Sounder Control Unit and Conventional VADs can be used.

VADs are required where risk assessment dictates that a Visual Alarm Device is required as a primary means of evacuation. Apollo’s range of Visual Indicators are still available for areas where a visual warning is required as a secondary means of notification.

For guidance on installation of VADs please refer to your local codes of practice such as BS 5839-1, LPCB CoP0001.

Contents

EN 54-23 Explained	4
Apollo Technology	5
Testing to the standard	5
Applications	6
Ceiling Category VADs	7
Wall Category VADs	8
Open Category VADs	9
Ambient Light Levels	10
Direct or Indirect viewing of the device	10
Multiplication Factors	11
Loop Powered Ceiling Category VADs	12
Loop Powered Wall Category VADs	14
Open Category Sounder VAD Bases	16
Frequently Asked Questions	18
Contact information	20

EN 54-23 Explained

EN 54-23 is the part of the EN 54 European product standard which addresses Visual Alarm Devices (VADs). The four main requirements are:

- > the illumination level
- > the flash rate
- > the flash colour
- > the installation category ie, the area covered by the flash.

The **illumination level** is required to be at least 0.4 lux in the whole area covered by the VAD.

The **flash rate** is set at 0.5Hz to 2Hz.

The **flash colour** is red or white only.

The Installation Category is a new concept and refers to the shape of the area illuminated by the VAD. The shape is determined by the mounting surface onto which the VAD is installed.

The three categories are:

- > Ceiling mounted - Category C
- > Wall mounted - Category W
- > Open class - Category O

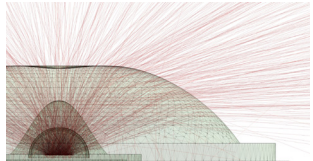
Other considerations when designing VADs into a system include:

- > Size of the room
- > Ambient light
- > Direct or indirect viewing of the device
- > Usage and occupation
- > Environmental conditions

Apollo Technology

High quality optical components are paramount when creating efficient VADs. Apollo has designed a range of highly efficient lenses to ensure our new VADs are certified to the EN 54-23.

Apollo's extensive in-house test facilities have enabled our engineers to make accurate measurements and perform situational testing of the lenses.



Category C Loop Powered VAD light distribution



Apollo dark anechoic chamber

Testing to the Standard

The Apollo dark anechoic chamber enables us to perform in house light coverage volume testing (specifically EN 54-23 clause 5.3.1) on all VAD products. A two turntable setup is used to perform the measurements at the correct alpha and beta rotations with a calibrated light metre the appropriate distance away.

All measurement data is fed back to the control PC, which has a specially designed in-house software program, to enable the engineer to create a 3D plot of the coverage volume whilst recording all results.

Applications

Typical situations where VADs would be required to comply with the UK Equalities Act*, the Building Regulations and other Codes of Practice, such as BS 5839-1, LPCB CoP 0001 Code of Practice for Visual Alarm Devices Used for Fire warning include:

- Visual warning for persons with impaired hearing, including bedrooms, sleeping accommodation, hotels and student accommodation
- Areas of high ambient noise, noise levels exceeding 85dB or where people wear ear defenders
- Staff restricted warning systems
- Nursing homes or hospitals
- Certain public assembly buildings
- Broadcast studios
- All sanitary facilities

* The UK Equality Act 2010 legally protects people from discrimination in the workplace and in wider society. Always refer to a buildings risk assessment (required under the Regulatory Reform (Fire Safety) Order) for guidance of where VADs are required.

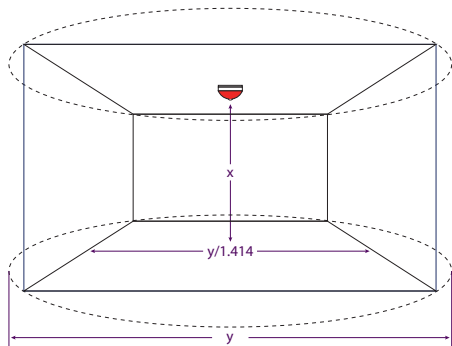


Ceiling Category VADs

The coverage volume code should be presented as C - x - y.

- > x is the maximum mounting height
- > y is the diameter in metres of the cylindrical coverage volume

If the VAD is approved to be installed at 3m and has a coverage diameter of 8.5m it would be referred to as C-3-8.5.



Ceiling Category VAD coverage volume

Example: Square area coverage conversion calculation, where $y = 8.5\text{m}$:
 $y \div 1.414 = 6\text{m sq area coverage}$.

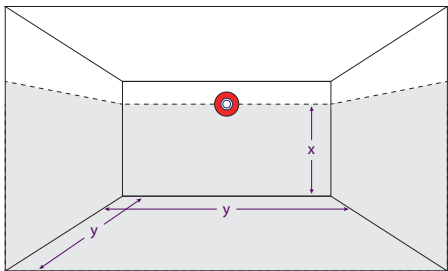
Wall Category VADs

The coverage volume code should be presented as W - x - y.

- > x is the maximum mounting height
- > y is the width of the square volume covered (in metres) by the device

Please note that the minimum mounting height for a wall category device is 2.4m.

If the VAD is approved to be installed at 2.5m and has a coverage square 7m x 7m it would be referred to as W-2.5-7.

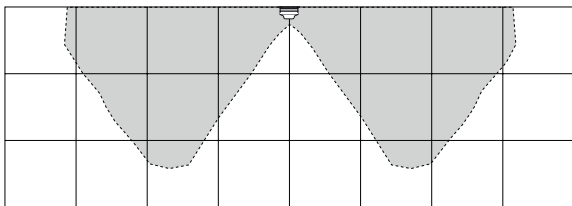


Wall Category VAD coverage volume

Open Category VADs

Open category allows the manufacturer to specify the coverage volume and gain certification to EN 54-23 Category O.

The required illumination of 0.4 lux still applies.



XP95 Sounder VAD Base - Cross section of the coverage volume.
Each square represents 1m.

Ambient Light Levels

Ambient light can significantly increase or decrease a VADs coverage:

- › The ambient light level should be the maximum anticipated at any time
- › True ambient light level may be reduced by measures such as blinds or curtains on windows
- › A lux metre complying with BS 667 may be used to determine the ambient light level

Direct or Indirect viewing of the device

The occupation and usage of the room should be considered:

- › Where possible, site the VADs for direct viewing for all occupants in the area
- › If not possible, consider the minimum illumination on adjacent surfaces
- › If relying on indirect illumination the reflecting surface should be within the coverage area of the VAD

Multiplication Factors

Multiplication factors should be applied based on ambient light, viewing angle and mounting position.

See the table below for the multiplication factors that should be applied to a VADs rated coverage.

Ambient light level (lux)	Ceiling mount direct view	Ceiling mount indirect view	Wall mount direct view	Wall mount indirect view
>100	2.8	1.3	5.2	1.8
100 to 200	2.4	1.2	4.4	1.7
200 to 300	1.9	1.0	3.2	1.4
300 to 400	1.4	0.8	2.3	1.2
400 to 500	1.1	0.6	1.8	1.0
500 to 600	0.9	0.5	1.3	0.9
600 to 700	0.7	0.4	1.0	0.7
700 to 800	0.5	0.3	0.7	0.6

Example: If ambient light is 150lux and the viewing angle is indirect, the coverage of a C-3-8.5 Ceiling Category VAD can be multiplied by 1.2 increasing the coverage from 8.5m to 10.2m.

Loop Powered Ceiling Category VADs

The Loop Powered VADs have been developed to comply with EN 54-23. VADs are primary or supplementary alarm devices for use in situations where there is a risk that sounders will not be heard. This may be due to high levels of background noise or if occupants have impaired hearing. These are available for both wall and ceiling applications.

For further information please refer to PP2486.

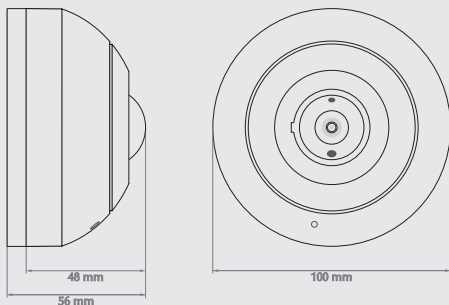
Features and Benefits

- > Synchronisation using the Apollo digital communication protocol
- > Can be fitted to any XPERT 7 or XPERT 8 mounting base
- > Automatic LED check when VAD activated
- > Fault signal if LED check failed



Technical information

Body Colour	White or Red	55000-740	Cat C Loop Powered VAD 15m (red body, white flash)
Flash Rate	0.5Hz	55000-742	Cat C Loop Powered VAD 8.5m (red body, white flash)
Flash Colour	White	55000-743	Cat C Loop Powered VAD 15m (white body, white flash)
Coverage class	C-3-8.5 C-3-15	55000-745	Cat C Loop Powered VAD 8.5m (white body, white flash)
Quiescent	280 μ A		
Current draw	12.0mA (C-3-8.5) 29.9mA (C-3-15)		



Loop Powered Wall Category VADs

The Loop Powered VADs have been developed to comply with EN 54-23. VADs are primary or supplementary alarm devices for use in situations where there is a risk that sounders will not be heard. This may be due to high levels of background noise or if occupants have impaired hearing. These are available for both wall and ceiling applications.

For further information please refer to PP2485.

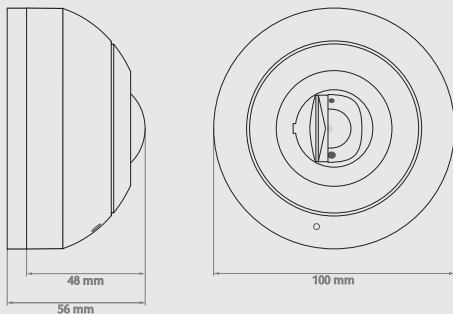
Features and Benefits

- > Synchronisation using the Apollo digital communication protocol
- > Can be fitted to any XPERT 7 or XPERT 8 mounting base
- > Automatic LED check when VAD activated
- > Fault signal if LED check failed



Technical information

Body Colour	White or Red	55000-741	Cat W Loop Powered VAD 7m (red body, white flash)
Flash Rate	0.5Hz		
Flash Colour	White	55000-744	Cat W Loop Powered VAD 7m (white body, white flash)
Coverage class	W-2.5-7		
Quiescent	280 μ A		
Current draw	16.0mA		



Open Category Sounder VAD Bases

The Category O Discovery Sounder VAD Bases combine an EN 54-23 Open Category VAD and a sounder on a mounting base. The base offers a choice of 15 evacuation tones, including the Apollo evacuation tone.

The Category O XP95 Sounder VAD Bases combine a loop powered Sounder and a VAD on a standard mounting base. The base is available with Dutch Slow Whoop (NEN2575) and DIN (DIN33404-3) tones.

For further information please refer to PP2476, PP2478 & PP2489.

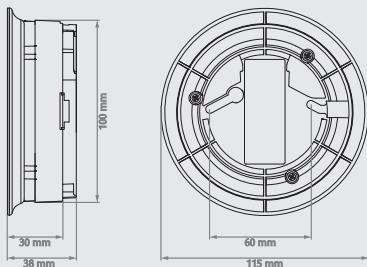
Features and Benefits

- > Synchronisation of "Alert" & "Evacuate" tones using the Apollo digital communication protocol
- > EN 54-3 certified sounder
- > Dual volume settings
- > Unique VAD & Acoustic self test
- > Built in short-circuit isolator



Technical information

Body Colour	White	45681-700	Cat O Discovery Sounder VAD Base with Isolator (white body, white flash)
Flash Rate	0.5Hz		
Flash Colour	White		
Coverage class	Open category (see datasheet for further information)	45681-705	Cat O XP95 Sounder VAD Base with Isolator (white body, white flash)
		45681-706	Cat O XP95 Sounder VAD Base Slow Whoop with Isolator (white body, white flash)
		45681-707	Cat O XP95 Sounder VAD Base DIN with Isolator (white body, white flash)
		45681-709	Cat O XP95 VAD Base with Isolator (white body, white flash)



Frequently Asked Questions

What exactly is EN 54-23?

EN 54-23 is the European standard for Visual Alarm Devices, ie, fire alarm devices, that can be seen rather than heard.

Why is it relevant to my business?

EN 54-23 is now part of European Law under the Construction Products Regulation.

Does Apollo have compliant Visual Alarm Devices?

Yes. Apollo has designed and developed VADs to meet EN 54-23 standard. The current product offering can also be found on our website: www.apollo-fire.co.uk/products/products-by-category/visual-alarm-devices

Does EN 54-23 mean that Visual Alarm Devices have to be officially approved?

Yes. All such devices, commonly known as VADs, have to be tested and approved by a "Notified Body", such as BRE or VdS.

What about combined alarms which are both audible and visual?

They have to be certified to both EN 54-23 and EN 54-3, the standard for sounders.

What is Category O and does it comply with EN 54-23?

Category O is a fully approved VAD that has a coverage area specified by the manufacturer.

Can I still use/install the existing range of Visual Indicators?

Yes. Visual Indicators can be used as secondary or supplementary alarm indicators on new installations. Visual Indicators may also be used as spares for existing sites and for small extensions to existing installations.

How does ambient light affect VAD performance?

Refer to the LPCB CoP 0001 Code of Practice for Visual Alarm Devices Used for Fire Warning which includes a Recommended Ambient Light Level table or any other applicable national standards.

How do I identify if a VAD has EN 54-23 approval?

An approved product will display the light volume coverage that it can achieve and this will be third party certified. All certificates are available on the Apollo website.

Do I need to install a VAD where I would have previously installed a beacon?

Only if it is required as a means of primary evacuation. A risk assessment would establish where best to install VADs.

Do Apollo offer conventional VADs?

Yes. For our conventional ceiling and wall offering please visit the Apollo website: www.apollo-fire.co.uk/products/products-by-category/visual-alarm-devices

Can I install as many VADs as visual indicators on the loop?

VADs have a higher current consumption than visual indicators. We recommend that the Apollo loop calculator, is used to ensure the loop loading is within limits. The loop calculator can be downloaded from Apollo website: www.apollo-fire.co.uk/products/loop-calculator

Consult datasheets for further technical information:

www.apollo-fire.co.uk/vads

Technical Support

Tel: +44 (0)2392 492412

Email: techsalesemails@apollo-fire.com

Customer Services

Tel: +44 (0)2392 492412

Email: ukorders@apollo-fire.com

or: exportorders@apollo-fire.com

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Please use this guide in conjunction with LPCB CoP 0001 Code of Practice For Visual Alarm Devices Used for Fire Warning and BS 5839-1 and any other local applicable standards.

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