EN54 Part 23 Made Easy
EN54 Part 23 Intent

- Standardise output levels from Visual Alarm Devices
- Improve designs & safety through ensuring enough light is generated across an entire area to alert occupants the Fire Alarm has activated

VAD’s are usually classed as a primary means to evacuate occupants
Common Primary methods for evacuating occupants in a fire:
  - audible alarm signal (from a bell or electronic sounder)
  - verbal message (from a voice alarm system)

But in many buildings, audible alarms are not enough?
  - Areas where there could be occupants who are deaf or hearing impaired (over 12 Million people that’s 19% of the UK population have some form of hearing impairment)
  - In areas of high ambient noise
  - Areas where people wear ear defenders
  - Operating theatres and broadcasting studios
  - Where members of the public are present
The Use of Visual Alarm Devices (VADs)

- Visual Alarm Devices have become standard equipment on Fire Systems
- Strobes, beacons or VADs have become the simplest way to overcome audible alarm constraints
- A Strobe device – often combined with a sounder and/or a sensor have helped many systems meet the needs of the Equality Act 2010, and the DDA (1995) before it
What drives the need for VADs?

- VADs form part of the fire safety strategy:
  - The risk assessment/specification
  - Fire safety legislation
  - Evacuation strategy
  - Varying types of occupants within a building

The Building regulations 2010

Consultation between the building user and the designer is critical
Where should VADs be installed?

The placement of VAD’s within a Building is open to interpretation, however the British Approvals for Fire Equipment UK (BAFE) state:

Consultation between the building user and the designer is critical.

However, there are certain places in all buildings that do require VAD’s, against which there is no argument. The below list is not exhaustive but it clearly applies to virtually every single building that requires a fire alarm system compliant with BS 5839-1/2013.

1. Toilets within buildings including individual cubicles as necessary.
2. Individual bedrooms within buildings.
3. Plant rooms and the like where hard of hearing personnel may be on their own (or loud plant may be present).
4. Areas of high background noise.
5. Individual cellular offices with no vision panel where a hard of hearing person may be present on their own.
6. Any other obvious places where a hard of hearing person may be on their own for a prolonged period of time. (NOT e.g. escape corridors that are likely to have other persons using them during an evacuation.)
Why should they be used?

Visual Alarm Devices
The Changing Regulatory Landscape
The Construction Products Regulation (CPR)

- CPR replaces the CPD which wasn’t adopted by UK. It is now a legal requirement for 3rd party certification to be harmonised to EN54 standards

- Implemented in UK and Ireland on 1st July 2013

- The CPR aims to break down technical barriers between EU countries by introducing:
  - harmonised technical specifications (eg EN54 Part 23)
  - assessing each product family with agreed methods & tests
  - a framework of notified bodies
  - CE marking of products
EN54 Part 23 – Visual Alarm Devices

•**Purpose:**
  • Standardisation of test methods, output performance and specification

•**Effective:**
  • Published in 2010 & harmonised on 31st December 2013

•**Compliance:**
  • Minimum illumination of 0.4 lux over the entire area of coverage
  • Stated coverage volume and standardised measurement
  • Flash rate 0.5Hz to 2Hz (to minimise epilepsy risk)
  • Flash colour white or red

*VAD’s are usually classed as a primary means to evacuate occupants*
EN54 part 23 incorporated in BS5839 Part 1:2013

- EN54 Pt 23 was initially a manufacturing standard
- Supported in BS5839 Part 1: 2013 to ensure it is applied correctly
  - Further support & Guidance in the Code of Practice CoP 0001 & the FIA Guidance document for Primary & Supplementary VAD’s & VID’s
Product Certification Categories
Certification of Part 23 Devices

- Testing during certification determines the coverage volume for a device

- This will be expressed in terms of the mounting height and dimensions (cylinder or cube) at which an illumination of 0.4lux (or 0.4 lm/m²) is achieved.

- This data enables compliant designs to be made for any certified device
EN54 Part 23 – Categories

- VADs will be classified based on their intended application:
  - Ceiling (C)
  - Wall (W)
  - Open (O)

- Ceiling and Wall devices have an installation height and area coverage defined by the standard

- Open Class
  - special cases where the light coverage or shape falls outside the predefined categories. Manufacturer has to provide additional information to carry out the design

VAD’s are usually classed as a primary means to evacuate occupants
Example of Wall Mounted Coverage Measurement

- **W-x-y**: Wall device

  - **W**: Wall

  - **x**: Maximum height in metres that the device can be mounted on the wall. The minimum allowable height is 2.4m.

  - **y**: The width of a square room within which the product is deemed to comply.

  - Example: W-2.4-6 denotes a wall mounted device that may be mounted at 2.4 from the floor and is good for a volume of 2.4m x 6m x 6m
Example of Wall Mounted Coverage Measurement

Cuboid shape with illumination of at least 0.4 lux

Min Height 2.4 m
Example of Ceiling Mounted Coverage Measurement

• C-x-y : Ceiling device

  • C : Ceiling

  • x : 3, 6 or 9 and represents the maximum height in metres that the product may be mounted.

  • y : The diameter in metres of a cylinder within which the product is deemed to comply

• Example: C-6-16 denotes a ceiling device that is good for a 16m coverage cylinder when mounted at a height no more than 6m from the ground
Example of Ceiling Mounted Coverage Measurement

Mounting Height = 6m
Diameter = 16m

Cylinder of light With min 0.4 Lux illumination
Distribute to ensure coverage of the whole room space

Spacing = 11.3m
O Category Device intended for

- Coverage volume of which is fully specified by the manufacturer
- Intended for specific, focused light applications

for example toilets.... But not much else...
O Category Device

- O Class might also indicate a device that is rated outside of the parameters of the testing schedules.

- The non-standard nature of an O Class device means that the manufacturer must provide bespoke device parameters to support the designer.
Coverage information
Light Output Coverage and Category

- Every VAD will have its light volume coverage printed on it

- This coverage is used to design the system to the requirements of the standard
### Information Labels on Part 23 Devices

#### Visual Alarm Devices (Red)

- **VAD HPR** (Red)
  - **High Power Option** - Manufacturer specific
  - **Lens Colour** (Red)
  - **Ceiling Device**

<table>
<thead>
<tr>
<th></th>
<th>Power Options Available</th>
<th>Coverage may be greater than the standard Test house categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VAD HPR (RED)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HIGH</strong></td>
<td>C-3-14</td>
<td>CATEGORY O</td>
</tr>
<tr>
<td><strong>MED</strong></td>
<td>C-3-13</td>
<td>CATEGORY O</td>
</tr>
<tr>
<td><strong>LOW</strong></td>
<td>C-3-10</td>
<td></td>
</tr>
</tbody>
</table>
Design Factors
Correction Factors – effects of light levels on strobes
VAD Application Considerations

• Factors to be considered when designing with VADs:

  • The light output coverage and category of the VADs used
  
  • Any factors within the application environment that might affect the visual impact of the VAD illumination, including:
    • Level of ambient light
    • Required field of view (direct or indirect viewing)
    • Reflectivity of surfaces
    • Effect of colour
    • Tinted Eye Protection (white would be more effective)
    • Usage and occupation
    • Environmental conditions

VAD’s are usually classed as a primary means to evacuate occupants
General Checklist

The effectiveness of VADs in a particular application will depend on:

• Do VADS fit this environment?

• Is this the right application for using VADS?

• What are the ambient light levels?

• What is the sensor or sounder spacing in the room?

There are some tools to help you to choose the correct device
Design Tools

Manufacturers should provide a design tool, an App or as a minimum comprehensive design tables

The Code of Practice CoP0001 provides a multiplication table to support device choice

The BS provides 18 pages of tables to support design scenarios
Designs & Correction Factors

• Height, line of sight & ambient light levels all affect device covered –
• Darker the room, easier it is to cover
• Brighter the room, the more difficult to cover
• Designs require to take this into consideration
• BS tables, Multiplication factors & Manufacturer tools are there to assist the designer meet the Lux Level requirements of the standard
The effect of light levels
Correction Factors

Uncorrected coverage – what’s on the label

C-3-12 @250Lux indirect correction factor is 1
Correction Factors

Bright Room with High Lux Level – reduced height & coverage

C-3-12 @420Lux - indirect correction factor is 0.6
Correction Factors

Darker Room with Low Lux Level – increased height & coverage

C-3-12 @190Lux - indirect correction factor is 1.2
Correction Factors – 3 options available
Option 1 - BS5839 pt 1 design tables
Option 1BS5839 Part 1 2013 Design Tables

- There are 18 pages of tables in Annex F designed to help with VAD designs in multiple scenarios:
  - Direct and indirect
  - Varying lux levels
  - Varying room sizes
The coverage of the VAD needs to be a C-3-14

One example:

- In a 10m x 10m room with a light lux at a maximum of 400 and a reliance of direct viewing
- The actual product coverage will be C-3-10

<table>
<thead>
<tr>
<th>Max. room size</th>
<th>VAD mounting height</th>
<th>Uncorrected BS EN 54-23 VAD rating required</th>
<th>Ambient light level (lux)</th>
</tr>
</thead>
<tbody>
<tr>
<td>m x m</td>
<td>m</td>
<td>(e.g. C-x-y)</td>
<td>&lt;100</td>
</tr>
<tr>
<td>2 x 2</td>
<td>C-3-2.8</td>
<td>C-3-1</td>
<td>C-3-1.2</td>
</tr>
<tr>
<td>3 x 3</td>
<td>C-3-4.2</td>
<td>C-3-1.5</td>
<td>C-3-1.8</td>
</tr>
<tr>
<td>4 x 4</td>
<td>C-3-5.6</td>
<td>C-3-2</td>
<td>C-3-2.4</td>
</tr>
<tr>
<td>5 x 5</td>
<td>C-3-7</td>
<td>C-3-2.5</td>
<td>C-3-3</td>
</tr>
<tr>
<td>10 x 10</td>
<td>C-3-14</td>
<td>C-3-5</td>
<td>C-3-5.9</td>
</tr>
<tr>
<td>15 x 15</td>
<td>C-3-21</td>
<td>C-3-7.5</td>
<td>C-3-8.8</td>
</tr>
<tr>
<td>2 x 2</td>
<td>C-6-2.8</td>
<td>C-3-1</td>
<td>C-3-1.2</td>
</tr>
<tr>
<td>3 x 3</td>
<td>C-6-4.2</td>
<td>C-3-1.5</td>
<td>C-3-1.8</td>
</tr>
</tbody>
</table>

The certified category of the device needs to be C-3-10
Option - 2  CoP Multiplication Factors
Option 2 - Multiplication Factors

- The LPCB CoP0001 includes multiplication factors that can be applied to the manufacturer’s stated light coverage of VADs.
- The outcome may slightly modify the manufacturer’s stated coverage depending on the conditions.

### Table 1: Coverage distance multiplication factors for VADs

<table>
<thead>
<tr>
<th>Ambient light level (lux)</th>
<th>Ceiling mount direct view</th>
<th>Ceiling mount indirect view</th>
<th>Wall mount direct view</th>
<th>Wall mount indirect view</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100</td>
<td>2.8</td>
<td>1.3</td>
<td>5.2</td>
<td>1.8</td>
</tr>
<tr>
<td>100 to 200</td>
<td>2.4</td>
<td>1.2</td>
<td>4.4</td>
<td>1.7</td>
</tr>
<tr>
<td>200 to 300</td>
<td>1.9</td>
<td>1.0</td>
<td>3.2</td>
<td>1.4</td>
</tr>
<tr>
<td>300 to 400</td>
<td>1.4</td>
<td>0.8</td>
<td>2.3</td>
<td>1.2</td>
</tr>
<tr>
<td>400 to 500</td>
<td>1.1</td>
<td>0.6</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>500 to 600</td>
<td>0.9</td>
<td>0.5</td>
<td>1.3</td>
<td>0.9</td>
</tr>
<tr>
<td>600 to 700</td>
<td>0.7</td>
<td>0.4*</td>
<td>1.0</td>
<td>0.7*</td>
</tr>
<tr>
<td>700 to 800</td>
<td>0.5</td>
<td>0.3*</td>
<td>0.7</td>
<td>0.6*</td>
</tr>
</tbody>
</table>

* see 4.6.9.4 a)

**Anything over 800 lux – put up some blinds!**
Using the Multiplication Table

Known Factors:
- VAD rating of W-2.4-3
- Wall Mounted
- Ambient Light 350 Lux
- Viewing Method indirect

- Table 1 gives a multiplication (correction factor of 1.2)
- Coverage of 3m sq is multiplied by 1.2 = revised coverage of 3.6
- Height rating of 2.4 m is multiplied by 1.2 = revised coverage of 2.88

- The VAD may therefore be used in this location as rating W-2.8-3.6

<table>
<thead>
<tr>
<th>Ambient light level (lux)</th>
<th>Ceiling mount direct view</th>
<th>Ceiling mount indirect view</th>
<th>Wall mount direct view</th>
<th>Wall mount indirect view</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 100</td>
<td>2.8</td>
<td>1.3</td>
<td>5.2</td>
<td>1.8</td>
</tr>
<tr>
<td>100 to 200</td>
<td>2.4</td>
<td>1.2</td>
<td>4.4</td>
<td>1.7</td>
</tr>
<tr>
<td>200 to 300</td>
<td>1.9</td>
<td>1.0</td>
<td>3.2</td>
<td>1.4</td>
</tr>
<tr>
<td>300 to 400</td>
<td>1.4</td>
<td>0.8</td>
<td>2.3</td>
<td>1.2</td>
</tr>
<tr>
<td>400 to 500</td>
<td>1.1</td>
<td>0.6</td>
<td>1.8</td>
<td>1.0</td>
</tr>
<tr>
<td>500 to 600</td>
<td>0.9</td>
<td>0.5</td>
<td>1.3</td>
<td>0.9</td>
</tr>
<tr>
<td>600 to 700</td>
<td>0.7</td>
<td>0.4*</td>
<td>1.0</td>
<td>0.7*</td>
</tr>
<tr>
<td>700 to 800</td>
<td>0.5</td>
<td>0.3*</td>
<td>0.7</td>
<td>0.6*</td>
</tr>
</tbody>
</table>

* see 4.6.9.4 a)
Option 3 - Manufacturer Specific Tools
Manufacturer Specific Tools
Lux Levels
Lux Levels

- Often provided in Electrical Specification
- Room Data Sheets
- Lux Level Meter Reading
- Designers guide
Lighting Levels

The CIBSE (Chartered Institute of Building Services Engineers) produce a “Code for Interior Lighting”, which gives lighting requirements for areas within buildings. This is also replicated in BS EN 12464-1:2011

<table>
<thead>
<tr>
<th>Illuminance (lux)</th>
<th>Activity</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Casual seeing</td>
<td>Corridors, changing rooms, stores</td>
</tr>
<tr>
<td>150</td>
<td>Some perception of detail</td>
<td>Loading bays, switch rooms, plant rooms</td>
</tr>
<tr>
<td>200</td>
<td>Continuously occupied</td>
<td>Foyers, entrance halls, dining rooms</td>
</tr>
<tr>
<td>300</td>
<td>Visual tasks moderately easy</td>
<td>Libraries, sports halls, lecture theatres.</td>
</tr>
<tr>
<td>500</td>
<td>Visual tasks moderately difficult</td>
<td>General offices, kitchens, laboratories, retail shops.</td>
</tr>
<tr>
<td>750</td>
<td>Visual tasks difficult</td>
<td>Drawing offices, meat inspection, chain stores.</td>
</tr>
<tr>
<td>1000</td>
<td>Visual tasks very difficult</td>
<td>General inspection, electronic assembly, paintwork, supermarkets.</td>
</tr>
<tr>
<td>1500</td>
<td>Visual tasks extremely difficult</td>
<td>Fine work and inspection, precision assembly.</td>
</tr>
<tr>
<td>2000</td>
<td>Visual tasks exceptionally difficult</td>
<td>Assembly of minute items, finished fabric inspection.</td>
</tr>
</tbody>
</table>
# Lighting Levels

<table>
<thead>
<tr>
<th>Area</th>
<th>Illuminance (lux)</th>
<th>Limiting Glare rating</th>
<th>Minimum colour rendering (R&lt;sub&gt;a&lt;/sub&gt;)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Educational</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classrooms</td>
<td>300</td>
<td>19</td>
<td>80</td>
</tr>
<tr>
<td>Technical drawing room</td>
<td>750</td>
<td>16</td>
<td>80</td>
</tr>
<tr>
<td>Computer practice rooms</td>
<td>300</td>
<td>19</td>
<td>80</td>
</tr>
<tr>
<td><strong>Healthcare - Wards</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General lighting</td>
<td>100</td>
<td>19</td>
<td>80</td>
</tr>
<tr>
<td>Reading lighting</td>
<td>300</td>
<td>19</td>
<td>80</td>
</tr>
<tr>
<td>Simple examinations</td>
<td>300</td>
<td>19</td>
<td>80</td>
</tr>
<tr>
<td>Examination and treatment</td>
<td>1000</td>
<td>19</td>
<td>80</td>
</tr>
<tr>
<td><strong>Hotels and Restaurants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td>500</td>
<td>22</td>
<td>80</td>
</tr>
</tbody>
</table>
## Lighting Levels

### Table 5.29 — Places of public assembly – Restaurants and hotels

<table>
<thead>
<tr>
<th>Ref. no.</th>
<th>Type of area, task or activity</th>
<th>$E_{m}$</th>
<th>$U_{G2}$</th>
<th>$U_{i}$</th>
<th>$I_{s}$</th>
<th>Specific requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.29.1</td>
<td>Reception/cashier desk, porters desk</td>
<td>300</td>
<td>22</td>
<td>0,60</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>5.29.2</td>
<td>Kitchen</td>
<td>500</td>
<td>22</td>
<td>0,60</td>
<td>80</td>
<td>There should be a transition zone between kitchen and restaurant.</td>
</tr>
<tr>
<td>5.29.3</td>
<td>Restaurant, dining room, function room</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>The lighting should be designed to create the appropriate atmosphere.</td>
</tr>
<tr>
<td>5.29.4</td>
<td>Self-service restaurant</td>
<td>200</td>
<td>22</td>
<td>0,40</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>5.29.5</td>
<td>Buffet</td>
<td>300</td>
<td>22</td>
<td>0,60</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>5.29.6</td>
<td>Conference rooms</td>
<td>500</td>
<td>16</td>
<td>0,60</td>
<td>80</td>
<td>Lighting should be controllable.</td>
</tr>
<tr>
<td>5.29.7</td>
<td>Corridors</td>
<td>100</td>
<td>25</td>
<td>0,40</td>
<td>80</td>
<td>During night-time lower levels are acceptable.</td>
</tr>
</tbody>
</table>

### Table 5.30 — Places of public assembly – Theatres, concert halls, cinemas, places for entertainment

<table>
<thead>
<tr>
<th>Ref. no.</th>
<th>Type of area, task or activity</th>
<th>$E_{m}$</th>
<th>$U_{G2}$</th>
<th>$U_{i}$</th>
<th>$I_{s}$</th>
<th>Specific requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.30.1</td>
<td>Practice rooms</td>
<td>300</td>
<td>22</td>
<td>0,60</td>
<td>80</td>
<td>Lighting at mirrors for make-up shall be “glare-free”. Disability glare should be avoided at mirrors for make-up.</td>
</tr>
<tr>
<td>5.30.2</td>
<td>Dressing rooms</td>
<td>300</td>
<td>22</td>
<td>0,60</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>5.30.3</td>
<td>Seating areas – maintenance, cleaning</td>
<td>200</td>
<td>22</td>
<td>0,50</td>
<td>80</td>
<td>Illuminance at floor level.</td>
</tr>
<tr>
<td>5.30.4</td>
<td>Stage area - rigging</td>
<td>300</td>
<td>25</td>
<td>0,40</td>
<td>80</td>
<td>Illuminance at floor level.</td>
</tr>
</tbody>
</table>
Practical Design Tips
Ceiling Mount

- The ceiling category gives the coverage as a diameter, which can lead to confusion as most rooms are rectangular.

If \( y = 7.5 \text{m} \) it does equate to a room \( 7.5 \text{mx}7.5 \text{m} \). The room is

\[
= \frac{7.5}{1.414} = 5.3 \text{m} \times 5.3 \text{m}
\]
Design Coverage Example

- Incorrect. Illumination levels not achieved
- Correct. VAD covers square areas
Wall Mount

- The wall category gives the coverage as a square, so a W – 2.4 – 6 provides coverage for a 6m square with the VAD in the middle of one side
Multiple Wall Mount

Room with a VAD at each end

Room with a VAD at each side

Important to keep VADs on opposite sides to give help direct visibility
Multiple Wall Mount

Square room with four VADs

Important to keep VADs on opposite sides to give help direct visibility. The coverage of the VADs must be bigger than the room so that reflections from the side walls can be reinforced for indirect viewing.
Ceiling and Wall Mount

Where a room dimension exceeds the coverage of wall VADs it can be covered by ceiling VADs or a mixture of wall and ceiling types as shown.
Alternative Means of Alerting People

- Buddy schemes
- Vibrating pillows
- Paging Systems
- Staff Alerts
Choice of VADs

Can VAD’s be loop Powered?

If No – Remember, the conventional option requires

- EN54 monitored Power Supply Unit
- Batteries
- 240 v supply
- Interface to & monitor PSU
- Conventional cabling
- Conventional Strobes
Loop Powered VAD’s

- **IF YES**

- What is loop loading

- How many can be powered on the loop

- Can you keep the spacing as per Detectors & Sounders

- Aim to have minimum changes to current practise
Summary

• Part 23 is now part of FDA Legislation
• Consider if VAD’s required to assist in the evacuation of premises you are protecting
• If yes, then they are part of the Primary means required to safely evacuate all occupants
• Use tools available to assist with designs to achieve 0.4 lux in areas where VAD’s are required
• Record any assumptions (i.e. light levels if not known & where you have sourced information)
• Dependant on FDA manufacturer, decide if you can use Addressable VAD’s or require to wire in Conventional devices
Questions
Tools from Gent by Honeywell to assist
Educational Video available
Design Guide

- A6 Design Guide now available and includes:
  - Overview and Background
  - Step-by-Step design guidance
  - Examples
  - Lighting Level Guidance
  - Correction Factor charts
VAD App Tool

- Create floor plans
- Built in Lux meter
- Drag and Drop Ceiling and Wall Devices (Low and High Powered)
- Attach and annotate photos of the room
- Informs user when coverage is complete
- Export to PDF
- Email report/results
VAD Tool

S-Quad Visual Alarm Estimator's Tool

Room Summary

<table>
<thead>
<tr>
<th>Room ID</th>
<th>Room Name</th>
<th>Detect of Smoke</th>
<th>VAD Spacing</th>
<th>Ambient Light</th>
<th>Device Colour</th>
<th>Line of Sight</th>
<th>Room Length</th>
<th>Width</th>
<th>Mounting Height</th>
<th>Area of Room</th>
<th>Device Type</th>
<th>Quantity</th>
<th>Certified Category</th>
<th>Max Mounting Height</th>
<th>Max Spacing of VAD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reception</td>
<td>10.0m</td>
<td>10.0m</td>
<td>250 Lux</td>
<td>White</td>
<td>Direct</td>
<td>10.0m</td>
<td>5.0m</td>
<td>2.5m</td>
<td>50 m²</td>
<td>White / Low Output</td>
<td>1</td>
<td>C-4 - 30.0</td>
<td>Max Height - 7.5m</td>
<td>Max Spacing - 10.0m</td>
</tr>
</tbody>
</table>
Data Sheets

S-Quad Multi-sensor with Integrated Sounder and Visual Alarms

<table>
<thead>
<tr>
<th>SPECIFICATION</th>
<th>IP 21 with used with IP Sensor Base 54-701</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx Weight</td>
<td>0.11kg (0.17kg with base)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-10°C to +40°C</td>
</tr>
<tr>
<td>Quantity of Sounder VADs per loop</td>
<td>High Intensity up to 16, Medium Intensity up to 80, Low Intensity up to 100</td>
</tr>
</tbody>
</table>

Sound Output at 1m: Sound output is typically 50dB(A) at 1m

Voice sounders: 76dB(A) at 1m

High performance white visual alarms:
- S4711-VADHPW: CTH Sensor + White VAD
- S4711-VADHPFW: CTH Voice Sensor Sounder + White VAD
- S4729-VADHPW: Heat Voice Sensor Sounder + White VAD
- S4911-VADHPWH: OPC Voice Sensor Sounder + White VAD

High performance red visual alarms:
- S4711-VADHPRR: CTH Sensor + Red VAD
- S4711-VADHPFPR: CTH Voice Sensor Sounder + Red VAD
- S4729-VADHPFR: Heat Voice Sensor Sounder + Red VAD
- S4911-VADHPFR: OPC Voice Sensor Sounder + Red VAD

Please note: If you require detailed information regarding light coverage please refer to the S-Quad Data and Installation Guide available from GENT Expert and Inpoint.

Dimensions (mm):

- 46.6 (63.8 with base)
- 117 (140 with base and IP21 plate)

Technical Specification - 11 Tone and Voice Sounders with VAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Integrated Sounder and VAD</th>
<th>VAD Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke Colour</td>
<td>Red or White</td>
<td>Red or White</td>
</tr>
<tr>
<td>Approx Max Quantity on Loop (dependent on loop load)</td>
<td>High Power - 24</td>
<td>High Power - 44</td>
</tr>
<tr>
<td>Medium Power</td>
<td>47</td>
<td>37</td>
</tr>
<tr>
<td>Low Power</td>
<td>72</td>
<td>100</td>
</tr>
<tr>
<td>Ingress Protection</td>
<td>Standard range IP21</td>
<td>Standard range IP21</td>
</tr>
<tr>
<td>Approx Weight</td>
<td>0.3kg</td>
<td>0.3kg</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-10°C to +40°C</td>
<td></td>
</tr>
<tr>
<td>Sound Output at 1m: 103 dB(A) ± 3 dB(A)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VAD Category - High Performance:
- Power setting: Red W-6.5-14, White W-6.5-12.5, White W-6.5-13.5

VAD Category - Standard Performance:
- Red W-6.5, White W-6.5

Stroke Flash Rate: 0.5Hz

Approvals:
- Sounder VAD EN54-5, EN54-22:2010, EN54-17
- Voice Sounders are LPCB certified to EN54-3 Annex C

Dimensions (mm):

- Sounder:
  - Sounder/Red Body: S3-S-R
  - Sounder/White Body: S3-S-W
- Voice Sounder RED:
  - Voice Sounder/Red Body: S3-V-R
  - Voice Sounder/White Body: S3-V-W
- Sounder VAD:
  - Sounder/Red Body: S3-V-VAD-HP-R
  - Sounder/White Body: S3-V-VAD-WH-R
- Sounder HP/White Body: S3-VAD-HP-R
- Sounder HP/White Body: S3-VAD-WH-R
- Standard Power Sounder VAD:
  - Standard Power Sounder VAD: S3-S-MDVAD-HP-R

Standard Voice Messages:
- Alert Message (female voice): An incident has been reported in the building, please await further instructions.
- Attention message (female voice): Attention please, this is an emergency. Please leave the building by the nearest available exit.