



Consumer Factsheet:

Selecting doorbells for people with hearing impairment

1. What are visual signalling devices?

Visual signalling devices use light instead of or in addition to sound to signal activation of communication devices, such as alarms, doorbells, and telephones. Like doorbells that emit sound, visual signalling devices have a transmitter (the button outside the door) and receiver/s (the light emitting device/s inside the house). They can be wired or wireless. Most emit a flashing light, but some are static. The most advanced wired systems flash the household lights during the day or dim them at night to signal activation of the doorbell.

2. Why should I consider a visual signalling device instead of or in addition to a hearing aid?

Hearing aids are often not suitable alternatives for people with severe or profound deafness. Often hearing aids cannot amplify sound enough to be heard, and they also amplify background noise, which can mask the doorbell and other desired sounds.

3. Are there regulations that govern visual signalling devices?

The research did not find any laws or regulations that impose specific requirements for visual doorbell signals. There are a few requirements and guidelines for visual signals to warn of emergencies, and these may provide useful guidance about the selection of visual doorbell signals. Australian Standard 1603.11 specifies requirements for colour, flash rate, and pulse duration for visual alarm systems (such as fire and smoke alarms), but does not apply to communication devices (such as



doorbells and telephones). The Standards Australia Handbook HB 123-1999 provides guidelines for brightness, colour, and placement of visual warning devices. The Building Code of Australia requires that “inbuilt communication systems for entry, information, entertainment, or for the provision of a service . . . be suitable for occupants who are hearing impaired”, but does not state how the requirement is to be met or what is “suitable for occupants who are hearing impaired.” The Americans with Disabilities Act Accessibility Guidelines (ADAAG) apply to public buildings in the United States and specify requirements for visual alarms including type, pulse duration, intensity, colour and placement.

4. What characteristics of visual signalling devices are linked to effectiveness?

Type, intensity (brightness), colour, and pattern appear to be linked to effectiveness.

5. What should I look for in a visual signalling device?

Most of the evidence found was expert opinion or anecdotal evidence. It suggests the following:

Type: Wired systems are currently the most reliable, but that may change as wireless technology develops. Flashing lights, especially strobe lights, are the most effective at gaining an occupant’s attention. If multiple receivers are used, their flashes should be synchronised. One study found that strobe lights do not reliably wake a person who is asleep, but another concluded that strobe lights are the most effective at waking a sleeper.

Brightness: Generally brighter lights are more effective at gaining attention. Brightness is expressed in candelas (the light output of one candle, measured at the source). The optimal brightness depends on room size and may depend on whether the occupant is awake or asleep. For example, in non-sleeping areas, 15 candelas is the recommended minimum brightness for a 6m² room; 95 candelas is the recommended minimum brightness for a 15m² room. In sleeping areas, 110 -177 candelas is recommended minimum, measured at pillow level.

Colour: White light is more effective than coloured light at gaining attention. Red light is the least effective.

Pattern: The flash rate is the number of flash cycles per second, expressed in Hz (1 Hz is 1 flash cycle per second). A flash rate of 1-3 Hz is recommended. The pulse duration is the length of time the device is illuminated, and experts recommend it should be no more than 0.2 seconds.

6. What environmental conditions are linked to effectiveness?

The evidence about environmental conditions was expert opinion or anecdotal. It suggests that ambient light, and room size and layout are linked to effectiveness.

7. What other factors affect whether a visual signalling device is right for me?

Other health conditions may compromise the usefulness or effectiveness of a visual signalling device. For example, if you have



any condition that affects your vision or ability to operate the system, a visual signalling device may not be appropriate for you. If you or any occupant of the house is sensitive to light or has epilepsy, the device could create problems. As your health condition may change over time, the appropriateness and effectiveness of a visual signalling device also may change over time.

The degree of your hearing loss may affect the appropriateness of a visual signalling device. People with severe or profound deafness use signalling devices more often than do people with less severe hearing loss.

You also should consider any personal preferences that you or other occupants have. For example, you may find that strobe lights are too annoying for everyday use. Flashing lights may annoy other occupants who do not depend on the visual signal to let them know that someone is at the door. You may find that you prefer using a table lamp rather than ceiling lights, or vice versa. Ask if it is possible to test a variety of devices before making a selection.

8. How are visual signalling devices installed?

Visual signalling devices are either wired or wireless. The most advanced wired systems flash or dim the household lights when someone rings the doorbell. Receivers in less complicated wired systems are contained in small mountable outlets, which are either battery operated and come with an inbuilt light or plug into house power points. Those that plug-in either come with a light or have a connection for a household light, bulb or strobe. See Figure 1.

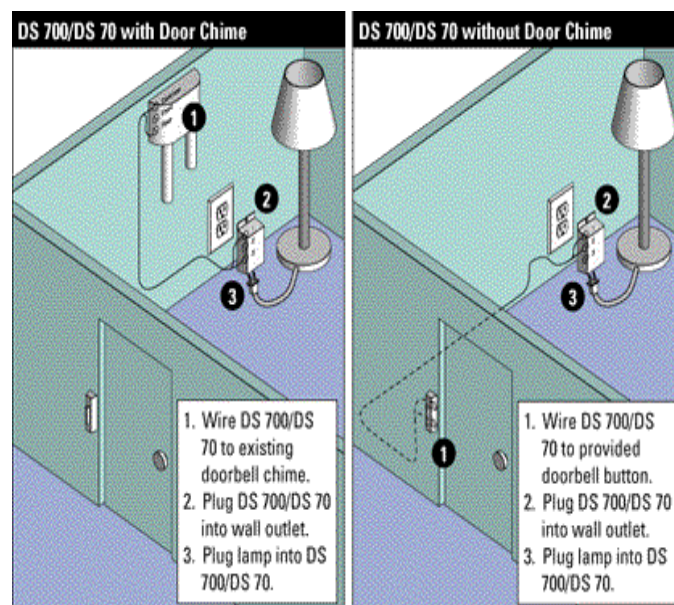


Figure 1. Examples of Wired Signalling Devices
(Sonic Alert, 2003)

Wireless devices transmit a signal to remote receivers. The remote receiver is either a battery operated freestanding light or an outlet that plugs into a power point and to which a lamp, bulb, or strobe is connected. Wireless devices are portable and can be moved from room to room, or receivers can be placed in various rooms throughout the house.

Visual signalling devices also can be installed to be triggered by the sound of the existing doorbell. The visual receiver is placed next to the auditory receiver and activated by microphones that pick up sound or sensors that detect magnetic pulses released when the doorbell is activated.

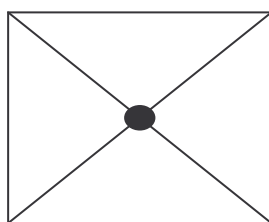
9. Where should I put the receivers?

Expert opinion and anecdotal evidence indicates that, as a general rule, the intended user should never be more than 15 metres from a receiver. Ideally, a receiver should be in every room; rooms larger than 15 square metres require more than one

receiver. Receivers should be mounted between 2.0 and 2.4 metres from the floor (HB 123-1999). The ADAAG recommends that receivers be placed either 2030 mm above the highest floor level or 152 mm below the ceiling, whichever is lower (ADAAG).

In a regularly shaped room a centrally located device may be adequate, depending on the size of the room. In an irregularly shaped room, the receiver should be placed on a wall where it can reach each corner. See Figure 2.

Regularly shaped Room



Irregularly shaped Room

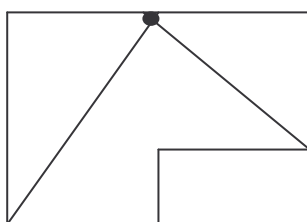


Figure 2: Placement of visual signalling devices within a regular and irregular shaped room

10. If I have a receiver in every room, will I always know when someone has rung the doorbell?

Not necessarily. There is little empirical evidence about the effectiveness of visual signal doorbells. There are some circumstances, however, when they may not get your attention. If you are outside, you will not notice the flashing lights inside the house; even if you have receivers outside, you may not notice them during daylight hours. Research also indicates that even strobe lights do not reliably wake people

who are asleep. If you are engaged in a task, you may not notice the flashing lights. The normal field of vision is only 110°. See Figure 3. If the flashing lights are outside that range, they will go undetected. That does not mean that the bulb or strobe must be within the field of vision, but the light it emits must be within the field of vision.

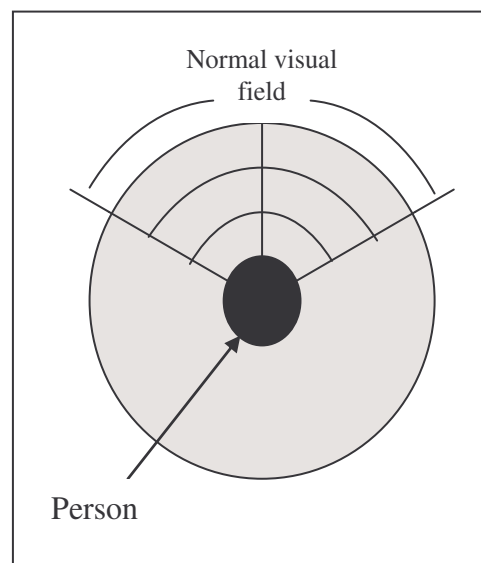


Figure 3. Field of Vision

11. What alternatives are available for times when a visual signalling device may not be effective?

Tactile signalling devices, which vibrate, also are available and may be effective alternatives to auditory or visual signal doorbells. This research identified specifications for 9 vibrating pagers to signal activation of a doorbell. This review did not seek evidence regarding the effectiveness of vibrating pagers. Service dogs also can alert to various sound signals in the environment.

12. How do I know if a device has the characteristics that will make it effective?

Unfortunately, the manufacturer specifications that were reviewed did not provide information about range, flash rate or pulse duration. Until Standards are enacted to require manufacturers to provide necessary information, you may need to have a device tested or contact the manufacturer to request specific information.

13. Do I need a separate device for my telephone?

Devices are available that use different flashing patterns to signal activation of individual devices. The research identified specifications for 18 devices that had different flash codes for different occurrences.

14. Where can I find more information?

- a. Regional Home Modification and Maintenance (HMM) service provider
- b. Occupational Therapist
- c. Resource library in the HMinfo website www.homemods.info