



HEARING SOLUTIONS- Hearing Aids

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How Hearing Aids Work



While the processing of modern hearing aids is complex, and computer programming is required to make some of the adjustments, the basic components that make them work has not changed. The basic function of a hearing aid is as follows:

- Sound waves enter through the microphone, which converts acoustic signals into electrical signals.
- The amplifier increases the strength of the electrical signal.
- From the amplifier, the signal is then transformed back to an acoustic signal by the receiver (a miniature loud speaker).
- From the receiver the signal is channeled into the ear canal, either through a small tube or through an ear mold.
- A battery is required to power the hearing aid and enable the amplification process.

Many hearing aids also have user controls (e.g. toggle switch, volume control wheel, push button, or remote control) that enable the wearer to adjust a variety of hearing aid parameters, including:

- Turning the hearing aid "on" or "off"
- Changing the volume
- Switching to the telecoil
- Switching between omni- and directional-microphone settings
- Switching to a different pre-programmed memory

Styles of Hearing Aids

Hearing aids have been available in four styles: body, eyeglass, behind-the-ear (BTE), and in-the-ear (ITE). Included in the category of ITE hearing aids are in-the-canal (ITC) and completely-in-the-canal (CIC) styles (all shown in the figures below). While body and eyeglass style hearing aids were regularly used 40- 50 years ago, they comprise only about 1% of all hearing aids marketed today. Instead, most individuals choose ITE (approximately 80%) or BTE (approximately 20%) style hearing aids. This transition in style, use, and preference is occurring for a number of reasons, including the reduction in the size of the components, durability, and cosmetic concerns on the part of the consumer.

The **ITE** style hearing aid fits directly into the external ear. The circuitry is housed primarily in the



concha (external) portion of the ear. Due to the miniaturization of the component parts (including the microphone, receiver and battery), it is possible to make hearing aids small enough to fill only a portion of the concha (ITC) or fit deeply into the ear canal (CIC). All three of these styles have typically been considered to be more modern and cosmetically appealing. However, modern BTE hearing aids have become smaller and at times are less noticeable than some ITC hearing aids. Other features of in-the-ear instruments are as follows:

- More secure fit, and easier insertion and removal than with **BTEs**.
- Improved cosmetic benefits with smaller styles (CIC, ITC).
- Less wind noise in the smaller styles than with BTEs.
- Directional microphone technology available for most styles, excluding CICs.
- Deep microphone and receiver placement with CICs may result in increased battery life and high frequency amplification compared with other styles.
- All components are integrated into a one-piece shell, which may be easier to handle and operate than for BTE styles.

The **BTE** style hearing aid is housed in a small curved case which fits behind the ear and is attached to a custom earpiece molded to the shape of your outer ear. Some BTE models do not use a custom earpiece; instead the rubber tubing is inserted directly into the ear. The case is typically flesh colored, but can be obtained in many colors and/or patterns. Other features include:

- BTEs may be the most appropriate choice for young children, as only the earmold needs to be replaced periodically as the child grows and the ear changes in dimension.
- Typically, BTEs are the most powerful hearing aid style available, and may be the best option for persons with severe-to-profound hearing loss.
- FM and direct auditory input is routinely available as an optional or standard feature.
- Telecoil circuitry is often more powerful than with ITEs.
- Non-occluding earmolds may be used with BTE hearing aids, if a medical condition exists or if the patient reports a “plugged” sensation when wearing other hearing aid styles.
- Directional microphone technology available with most BTE styles and models.
- Larger battery sizes used in BTEs may be easier to handle than smaller styles for those with limited manual dexterity or vision deficits.

[Click Here for a Brief Guide to Modern Hearing Aid Technology](#)

[Click here to learn more about Hearing Aid Compatible Cell Phones](#)

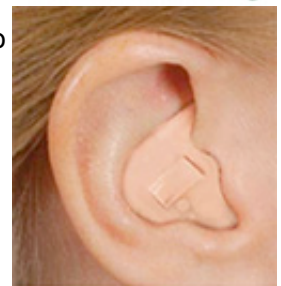
[How to buy a cell phone when you have a hearing loss](#) (Courtesy: Volta Voices Jan/Feb 2009 – by Janice Schacter)



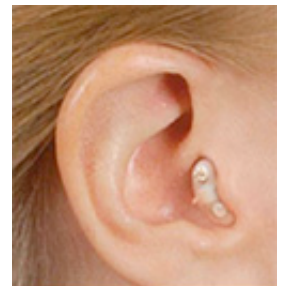
BTE w/ earmold



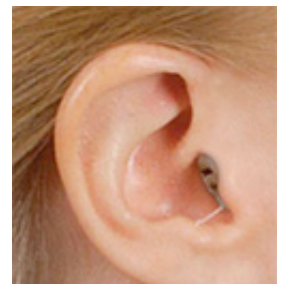
BTE w/ small tubing



ITE



ITC



CIC