

Behind-the-ear hearing aid (BTE)

Digital battery-powered devices for receiving, amplifying, and modulating environmental sound and voices, with different electronic components (microphone, amplifier circuitry, miniature loudspeaker/receiver, sound processor, and battery), housed in a plastic case, worn behind the ear. Behind-the-ear hearing aids carry sounds from the environment into the ear, with a thin transparent plastic tube to a custom-made silicon ear mold, make low sounds louder, make loud sounds more comfortable, and modulate them. Common behind-the-ear hearing aid features are environmental noise reduction, directional microphones, rechargeable batteries, feedback suppression, T-coil / telephone switch for connection with hearing loop (ISO 22.18.30), connectivity to FM systems (ISO 22.18.24), wireless connectivity, remote controls, variable programming, tinnitus masking, different colors, and headband (for placing the device in the headband).

Possible variants concern the dimensions of the case (can be also a mini behind-the-ear, worn on-the-ear), the type of the ear mold (can be also non-customized), the size of the ear mold (can be also small), the style how the sound reach the ear canal (can be also receiver in the ear canal), the fitting (can be also open fitting, connected to a tip that sits within the ear canal without blocking the ear canal completely), the batteries (which can be also rechargeable), the power of batteries (can be also powerful batteries for so called power behind the ear hearing aids), and the operating system (can be also analogue without sound processor and less options).

- Product Classification

- APL (WHO Assistive Product Priority List): 17 (Hearing aids (digital) and batteries)
- ISO 9999:2022: 220615 (Behind-the-ear hearing aids)

- Possible configuration variants

None specified.

- Possible accessories or optional components

None specified.

- Product goals

Activities or functions the product is mainly intended to support, according to WHO ICF Classification:

- Hearing [\[b230\]](#).
- Listening [\[d115\]](#).
- Understanding spoken words [\[d310\]](#).

- Indicated impairments

Difficulties the product is mainly intended to address, according to the WHO ICF Classification:

- Hearing [\[b230\]](#) (any type of unilateral or bilateral mild, moderate, severe, or profound hearing loss, which may or may not be medically treatable).

- Contraindicated impairments

Difficulties for which the product may be inappropriate:

- Temporary hearing loss that can be completely treated by medical intervention that will restore normal hearing (due e.g., to earwax small object occlusion).

- Indicated environments

Specific environments in which the product should be used:

None specified.

- **Contraindicated environments**

Environments in which the product may be inappropriate:

- Underwater.

- **Other indicated factors**

Other factors or situations the product is intended to address:

None specified.

- **Other contraindicated factors**

Other factors or situations in which the product may be inappropriate:

None specified.

- **Points to be considered in product selection**

- Before selecting a behind-the-ear hearing aid, ensure that the hearing loss is not due to a removable obstacle in the ear canal.
- Hearing assessment (audiogram) and diagnostic of hearing are necessary for adequate and personalized selection of a hearing aid.
- Digital hearing aids are for sensorineural hearing loss, conductive hearing loss, mixed hearing loss, and for every degree of hearing impairment or loss (deafness).
- For conductive hearing loss, both analog and digital hearing aids can be selected; analog devices have fewer possibilities to modulate and adapt the incoming sound.
- A behind-the-ear (BTE) hearing aids is suitable for any kind of hearing impairment (conductive, sensorineural, mixed), and improves every degree of hearing loss (mild, moderate, severe, profound). It is suitable for all ages (children to adults), and it is simple to use. It is more affordable than smaller styles of hearing devices and has long battery life. It is easy to clean, is easy to handle, is less susceptible to damage, and is more visible than in-the-ear and in-the canal devices.
- Replacing the battery is easy (due to the bigger size of the case).
- Due to the position, a behind-the-ear device can pick up more wind noise.
- The configuration of a power behind-the-ear aid, with powerful battery, can be also suitable for severe and profound hearing impairment or loss (deafness).
- The custom-made ear mold of a behind-the-ear hearing aid fits safely, is suitable also for children, but can cause occlusion; custom-made ear mold services must be available and accessible.
- If custom-made ear mold services are not available, a receiver-in-canal (RIC) and a receiver-in-the-ear (RITE) hearing aid configuration can be suitable.
- Non-custom-made dome available in different shapes and sizes is easy to clean and to change.
- The receiver-in-canal device (RIC) and the receiver-in-the-ear device (RITE) configuration style is not recommended for users with severe to profound hearing impairment or loss (deafness), is susceptible to earwax clogging the speaker, is difficult to handle and to adjust (due to smaller parts), is not suitable for people with dexterity issues or grasping limitation and is not suitable for children.
- Consider the cost of hearing aid batteries when they need to be replaced; batteries must be available.
- Rechargeable batteries are recommended if daily access to electric current is guaranteed; choose extra rechargeable batteries if daily access is not guaranteed or power bank recharger.
- A behind-the-ear hearing aid with tinnitus masking is suitable for hearing loss associate with tinnitus.
- For person without or deformed auricle, the behind-the-ear hearing aid can be fixed with a hand band.
- To prevent loss and damage caused by falling, select a behind-the-ear hearing aid that offers the possibility to attach a retention cord with a clip for fixing on collar; a retention cord is recommended especially for children and people with multiple disabilities.
- Ensure that the device is programmable and contains programs for noise reduction and for the sound scenery of the environment where the device will be used.
- Ensure that the device has a Telecoil (T-coil) / telephone switch for use in places equipped with a telecoil transmission system like in church, theater, and airport.
- For use with smartphones, ensure that the hearing aid is equipped with a Bluetooth technology connectible to iOS and Android phones, televisions, tablets, and other favorite audio devices.
- Skin or hair-colored cases are less visible; colored cases can meet personal preferences.

- Once all points above have been addressed, the style of the behind-the-ear hearing aid, type of the receiver, and level of amplification should be identified: this will allow calculation of the price class of the hearing aid and the various features required.
- **Points to be considered in product fitting**
 - The behind-the-ear hearing aid must stay firmly behind the ear, the tube or wired connected the earpiece must be not too short and not too long.
 - An impression is needed for custom-made ear molds; the silicon or plastic ear mold must fit perfectly and comfortable in the entrance of the ear canal.
 - For in the ear or in the canal receiver choose the best fitting dome related to the person's ear canal.
 - The volume (gain) control is used to adjust the amount of amplification needed for linear hearing loss (same gain for all frequency).
 - Different amplification for different frequency loss (low, middle, high) should be adjusted by an audio metrist or a hearing aid specialist, able to modify the software parameters of the digital sound processor; behind-the-ear hearing aids should be especially programmed to match the results of the users hearing test.
 - Audiometric vocal testing with the selected hearing aid is important to evaluate hypoacusis and therefore to the prescription of a hearing aid; the speech banana is a helpful tool for adaptation of the hearing aid to the specific hearing loss.
 - Ensure that the user can switch on/off the hearing aid, can manage the control function, fit the device in the ear or in the canal and take it off.
 - Ensure that the user (or caregiver) can replace or recharge correctly the batteries, can clean and dry the ear mold or dome, and can store the device correctly when it is not used.
 - In case of bilateral hearing loss with different amplification profile for left and right ear, ensure that left and right hearing aid are easily distinguishable.
- **Points to be considered in product use**
 - If the user does not use the hearing aid (for example at night), carefully store them, always in the same place, carry them in a special case (for blind or visually impaired user tactile makers may be needed on the case for left and right device), and keep it away from heat or heat sources, as they can damage the device.
 - At night, it is advisable to leave the battery compartment open for better drying; keep the device always dry.
 - Charge batteries during the night.
 - Do not use hearing aids underwater.
 - Ensure that batteries have enough charge during the use, backup battery are recommended.
 - In noisy environment, choose specific program for noise reduction.
- **Points to be considered in product maintenance / follow-up**
 - Regularly (daily) clean the ear mold, the transparent tube, or the dome, dry them accurately.
 - Regularly control if batteries are charged or need to be exchange.
 - Regularly inspect the firmly fitting of the custom-made ear mold (the ear form can change especially in children).
 - In case of frequent sound feedback issues (hearing aid starts whistling), consult a hearing aid center for technical control.
 - In case of increased problems with listening or understanding, repeat a hearing test and a functional test of the hearing aid.
- **Examples of products available on the market**
 - Live product search in the EASTIN website <https://www.eastin.eu/en/searches/products/list?iso=220615>

Source

This Fact Sheet was compiled in 2021 by an international team of experts, to provide the initial knowledge base for a project ("An online system to assist the selection of assistive product") supported by the World Health Organization in 2020-2021 within the GATE Initiative (Global collaboration on Assistive Product). Fact Sheets were compiled for each of the 50 types of products included in the WHO APL (Assistive Product Priority List).

The team was composed of Renzo Andrich (Italy, group leader), Natasha Layton (Australia), Stefan von Prondzinski (Italy), Jerry Weisman (USA), Silvana Contepomi (Argentina) and Hasan Minto (Pakistan).

The project led to a prototype online tool called ASPREX (ASSistive PROduct EXplorer). At the end of the project, it was transferred to a WHO collaborating center (the Global Disability Hub in the UK), in view of possible future developments.