ASPREX Fact Sheet

In-the-ear hearing aid (ITE)

Device for receiving, amplifying, and modulating environmental sound and voices for a person with hearing problems. An in-the-ear hearing aid is worn within the ear. An in-the-ear hearing aid is a digital electronic device with different electronic components housed in a small custom-made case. The main components are microphone, amplifier circuitry, sound processor, miniature loudspeaker/receiver, and battery. In-the-ear hearing aids carry sounds from the environment into the ear, make low sounds louder, loud sounds more comfortable, and modulating incoming sounds. The body interface case of in-the-ear hearing aids are custom made (worn in the bowl-shaped area of your outer ear) and powered by a small hearing aid battery.

Possible configuration variants concern the dimensions (full shell, worn in the bowl-shaped area of the outer ear, or half shell, worn in the lower part of the outer ear), and the batteries (replaceable or rechargeable).

- Product Classification
  - APL (WHO Assistive Product Priority List): 17 (Hearing aids (digital) and batteries)
  - ISO 9999:2022: 220612 (In-the-ear hearing aids)
- Possible configuration variants

  None specified.
- Possible accessories or optional components
  - Environmental noise reduction.
  - Directional microphones.
  - Connectivity to FM systems (ISO 22.18.24).
  - Telecoil sensor (also called T-coil sensor or T-switch, for connection to hearing loop (ISO 22.18.30)).
  - Wireless connectivity (can be connected to smartphone).
  - Remote controls.
  - Variable programming.
  - Tinnitus masking.
- 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 to severe hearing loss).
- Contraindicated impairments

  Difficulties for which the product may be inappropriate:
  - Profound hearing loss.
  - 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.
  - Windy places (strong wind may create noises because the microphone is not protected).
- ## 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:
  - Use by children.
- ## Points to be considered in product selection
  - Before selected an in-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 an in-the-ear hearing aid.
  - An in-the-ear (ITE) hearing aid is custom moulded. It is suitable for any kind of hearing loss (conductive, sensorineural, mixed), and it improves mild to severe hearing loss in adults. It is suited to users with dexterity issues or visual impairment. It is not suitable for children.
  - Recharging batteries (rechargeable model) is easier than replacing the battery (replaceable model).
  - 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.
  - Consider the cost of hearing aid batteries when they need to be replaced; in-the-ear device batteries have shorter battery life, thus batteries must be available.
  - In-the-ear hearing aids are not indicated for very windy environments.
  - In-the-ear hearing aids are available in a range of colours to match with user's skin tone.
  - For hearing loss associated to tinnitus, select in-the-ear hearing aid with tinnitus masking.
  - Ensure that the device is programmable and includes programs for noise reduction and for the sound scenery of the environment where the device will be used.
  - For use in connection to smart phones, ensure that the hearing aid is equipped with a Bluetooth technology connectable to iOS and Android phones, televisions, tablets, and other favourite audio devices.
  - Once all points above have been addressed, the style of the in-the-ear hearing aid and level of amplification should be identified: this will allow calculation of the price class of the hearing aid and the various features required.
  - Different amplification for different frequency loss (low, middle, high) should be adjusted by an audio metrist or a hearing aid specialist, able to adjust the software parameters of the digital sound processor. The in-the-ear hearing aids will be especially programmed to match the results of the user's hearing test.
- ## Points to be considered in product fitting
  - The in-the-ear hearing aid must stay firmly and comfortable in the out ear.
  - An impression of the outer ear is needed for customizing the in the ear hearing aids.
  - The volume control (directly or remote) is used to adjust the amount of amplification needed for linear hearing loss (same gain for all frequency).
  - Ensure that the user can switch on/off the hearing aid, manage the control function, fit the device in the ear or in the canal and take it off.
  - Ensure that the user (or care giver) can change the battery (replaceable model) or recharge the batteries correctly (rechargeable model), clean and dry the hearing aid, and store the device correctly when not used.
  - Ensure that left and right hearing aid are easily distinguishable in case of bilateral hearing loss.
- ## 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 (blind or visually impaired users need tactile markers for distinguishing left and right device) and place it far from heat or heat sources, as they may damage the device.
  - Ensure that the batteries have enough charge during use; reserve battery are recommended.

- Charge batteries during the night.
- In noisy environment, choose specific program.
- Do not use hearing aids in water.
- When activating the T-Coil switch for use of hearing loop system (ISO 22.18.30), remember that the hearing aid microphone is switched off; remember to switch off T-coil function, when leaving the inductive loop area.

- Points to be considered in product maintenance / follow-up
  - Regularly (daily) clean the device, dry them thoroughly.
  - Regularly control if batteries are charged or need to be replaced.
  - Regularly inspect the product firmly fits in the ear.
  - 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=220612

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.