



Worcester Hearing Centre

# Your Guide To Hearing Aids

The types, the technology levels and the features, what you really need to know about hearing aids

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# Introduction

Hearing aids are a big investment, we want to give you the knowledge to make that investment with confidence

*Worcester Hearing Centre*

We are pretty sure we know the feeling.

You are in the middle of trying to decide which hearing aids might be for you but the gobbledygook is almost thicker than fog.

Which one is for you? What type is the best? What the hell are directional microphones? Even when you get an answer it can be more confusing than it was.

So we have set out to detail all the details (see what we did there) however, we are going to try our best to give it to you in clear and plain English.

You can read more about hearing aids and the people who provide them on our website at

<http://www.worcesterhearingcentre.co.uk/>

# Hearing aid types, an introduction

Let's talk hearing aid types

## MODERN HEARING AID TYPES

While there are a vast range of hearing aids available they normally fall within just a few types. Each type has different strengths and weaknesses and differing suitability for different people. Let's explore the different types including the pros and cons of each one.

### What Are The Hearing Aid Types?

There are three hearing aid types that are most spoken about, they are as follows:

- BTE Hearing Aids; These devices are worn with the hearing aid on top of and behind the ear. All of the parts are in the case at the back of the ear and they are joined to the ear canal with a sound tube and a custom mold or tip.
- ITE Hearing Aids: These are custom made devices, all of the electronics sit in a device that fits in your ear, they come in many sizes including CIC (completely in Canal) and IIC (Invisible in Canal).
- RIC RITE Hearing Aids: These devices are similar in concept to BTE hearing aids, with the exception that the receiver (the speaker) has been removed from the case that sits at the back of the ear. It is fitted in your ear canal or ear and connected to the case of the hearing aid with a thin wire.

## Bluetooth Hearing Aids, Wireless Versus Non Wireless Hearing Aids

Before we delve a little deeper into the different types of hearing aids it is important to discuss a new type that has become commonly known to the general public as Bluetooth hearing aids, but to us in the profession as wireless hearing aids. All of the hearing device manufacturers have introduced wireless hearing aids over the last few years. Some have even introduced Made For iPhone hearing aids which we will discuss elsewhere. While some of them work with Bluetooth connections, they aren't exactly bluetooth. However, just recently most of the hearing aid manufacturers have signed up to the single bluetooth protocol so a standardised method is coming.

Most of the manufacturers have designed their own flavour of wireless signal. Wireless communication between hearing aids and between hearing aids and other accessory devices has really been a game changer for people who wear hearing aids. Not just has it made it easier for people to enjoy their TV, phone calls and group situations, the wireless communication has also enabled jaw dropping features in the hearing aids that deliver a much better experience for their users. As you can probably tell, I like wireless hearing aids. Some people choose discretion over wireless communications when choosing custom hearing aids. Honestly, and that is what this site is about, honesty, I think they are quite mad. Perhaps, certifiable. So in finishing, go wireless and you will never go back.

# RIC (Receiver in Canal) Hearing Aids

RIC /RITE Hearing Aids, sometimes called Speaker in Ear hearing aids are discreet but powerful hearing aids, let's take a deeper look at them.



# RIC / RITE Hearing Aids

## DISCREET BEHIND THE EAR DEVICES

RIC (Receiver in Canal) / RITE (Receiver in The Ear) are recent additions to the hearing aid world.

In an effort to produce ever smaller Behind The Ear hearing aids, manufacturers moved the receiver (the speaker part) out of the body of the hearing aid and placed it at the end of a wire that went into the ear canal.

The devices have become hugely popular because they are massively versatile fitting many types of hearing losses and very discreet. In some cases they are more discreet than in the ear hearing aids.

They do however have their pros and cons, let's take a deeper look at them.

## THE PROS & CONS OF RIC HEARING AIDS

As with many things in life there are pros and cons with RIC hearing aids, let's take a deeper look at them. First let's take a look at the advantages of RIC devices.

### What Are The Advantages Of RIC Devices?

#### Discreet

They are highly discreet devices, although the body of the hearing aid sits behind the ear they are normally very small and discreet. Unless some one is actually checking they invariably go un-noticed. The wire that leads from the body of the hearing aid into the ear canal is tiny and should sit along the crease of your face at the ear, hence, it is almost un-noticeable as well. Because of these two facts these are among the most discreet hearing aids available.

#### Easy Change Receivers

Because the receiver is inter changeable these hearing aids can cover varied hearing losses from mild all the way through to severe to profound. It also means that if the receiver fails, which happens, it is easily changed out for a new one. This means that the hearing aid does not have to go away for repair for a receiver change, it can be done instantly in the office if the hearing professional has spare receivers.

### What Are The Disadvantages of RIC Devices

## **Receiver Issues in RICs/RITEs**

The fact that the receiver is placed in the canal or the ear is both a blessing and curse. This placement exposes it to the hostile environment that the ear is for electronics. Your ear canal is wet warm and oily, all of the things that electronics tend not to like. The manufacturers take great pains to protect the receivers with nano coating materials, enclosed casings and wax guard protectors. However, unless you take good care of the receivers, changing your wax guards when you should, inevitably wax gets into them.

At best, this can just block the sound outlet, at worst, it can ingress into the receiver itself and destroy it. Wax and moisture is the kiss of death for receivers. Thankfully, the receivers are easily replaced by your hearing professional, however, after the manufacturer's warranty is up you may have to pay for them. While they vary in cost, they are not expensive, however, if you are replacing them regularly, the cost adds up.

I don't want to put you off this device types, they are exceptionally versatile and I really like them. If you are recommended this type of device just be aware of the receiver issues. Many of the hearing healthcare professionals we partner with can arrange a five year manufacturer's warranty to cover repairs. Some may charge, some may actually offer it for free. If you are considering buying RICs, ask about an extended manufacturers warranty.

## **Maybe Too Small!**

As I said, RICs / RITEs are very small and discreet devices, normally the smaller they are, the smaller the battery they use. Both the size of the hearing aid and the size of the battery can cause difficulties for people with dexterity issues. The whole idea of acquiring hearing aids is so that you can wear them and enjoy the very real benefits of hearing better. If you have difficulty handling them to put them in, what should be a joy can easily turn into a frustrating task. The same has to be said about the batteries, small batteries can be a nightmare for people with vision or dexterity issues. Many of the hearing aid manufacturers offer RIC / RITE hearing aids in a variety of sizes and battery sizes, for instance Phonak offer the Audeo V range in a size 10 battery, a size 312 battery and a size 13 battery.

## **Contra-indications To Wearing RICs / RITEs**

There are some people who shouldn't wear these type of devices. If you have permanent perforations in your ears or you have had a mastoid operation these hearing devices aren't really for you. As you will know if you have these problems there is an increased risk of middle ear infections and fluid release. Either will destroy the receivers of the hearing aids, because of the nature of your ears with



these conditions receiver failures would be an ongoing problem rather than an occasional frustration. The same can be said for people who suffer with wet ears or produce a large amount of earwax, either conditions will cause issues for the receivers. You can read about the [best way to clean and maintain RIC hearing aids here](#)

# ITE (In The Ear) Hearing Aids

In The Ear or custom hearing aids are discreet and popular hearing aids for consumers, let's take a deeper look at them



# Custom Hearing Aids

## ITE, CIC, IIC HEARING AIDS

Custom hearing aids or in the ear hearing aids come in many shapes and sizes, from quite visible Full Shell hearing aids to the so called hidden hearing aids, the Invisible In Canal or IICs

Custom hearing aids have been around for a very long time, as I said they come in many shapes and sizes that deliver different levels of power and functionality. They were hugely popular devices but when RIC / RITE devices were introduced their popularity waned somewhat.

With the introduction of the so called "Invisible hearing aids" several years ago there has been a resurgence in their popularity. Hearing aid manufacturers are also overcoming some of the technical challenges that reduced the functionality of the very small custom device types in the recent past.

This has made the devices a better choice for people who need more help in tougher environments but want a very discreet package. Many of the manufacturers now offer small completely in canal devices that are wireless enabled.

## CUSTOM HEARING AID TYPES

### Invisible Hearing Aids

So called invisible hearing aids or hidden hearing aids have been with us for a while, however, initially they actually weren't that hidden. That has changed though over the last five years. The manufacturers cracked the difficulties that precluded them from making really invisible hearing aids. Since then every manufacturer has introduced a truly invisible in the canal hearing aid range. They fit deeply in the ear canal and the faceplate can not be seen easily. They are truly discreet hearing devices and they have been well received. There are of course disadvantages, the IIC hearing aids are too small to be wireless.

For some this is an easy trade off, they forgo wireless capability for the discretion, however, I believe there is a lot to be said for wireless capability. I think wireless accessories are outstanding solutions and used well they have changed the lives of hard of hearing people dramatically for the better. But hey, that's just me. Invisible hearing aids are not suitable for everyone for several reasons, some reasons I will discuss later when talking about the overall pros and cons of custom

hearing aids. However, there is one that is particular to invisible hearing aids, canal size and shape. If your canal is not the right shape or size, you are out of luck.

### **Completely In Canal Hearing Aids / Mini In Canal**

Completely in canal or CIC hearing aids are pretty discreet devices that will go unnoticed except by the keenest eye. Up to recently they were pre-dominantly non wireless, however in just the recent past many manufacturers have released wireless enabled CICs. I think that this is a fantastic break through, however, wireless enabled devices are slightly bigger than non wireless CICs so you need to consider that before you go ahead if complete discretion is your objective. What is hugely interesting is that some manufacturers have managed to fit directional microphones on CICs, this again is a recent break through.

Directional microphones give real assistance in noisy environments, however this is the first time they have been on CICs so it will be interesting to see the effect they have. Early reports indicate that they deliver better speech clarity in group and noisy situations. Again though, directional mics make the CIC slightly larger, I believe though that like wireless, the functionality is well worth the trade off. Mini in canal hearing aids are all of the above except slightly larger, most mini in canals would come with wireless functionality and directional microphones.

### **Full Shell & Half Shell Hearing Aids**

They are as they sound, larger custom hearing aids that sit in the concha or bowl of the ear. The half shell basically fills half the concha and the full shell fills the whole concha. The traditional benefit of these devices has been more features, more power and physical controls like programme button and volume controls. In the recent past with the introduction of wireless capability and more powerful solutions at CIC level those benefits have all but become negated. However, these devices still have advantages, they usually have bigger battery sizes which allows them to work longer between changes and they are easier to handle for people with dexterity and vision problems.

## **THE PROS & CONS OF CUSTOM HEARING AIDS**

Yes you guessed it, there are most definitely advantages and disadvantages to custom hearing aids. Let's take a deeper look at what they are.

### **What Are The Advantages Of Custom Hearing Devices?**

**Discreet**

The smaller devices are highly discreet and the invisible hearing aids are in fact, invisible. The larger devices are of course not as discreet.

### **Easy To Handle**

Because the devices are all in one units they can be easy to handle and to place in the ear especially the larger hearing aids.

## **What Are The Disadvantages of Custom Hearing Devices?**

### **Receiver Issues, Microphone Issues**

Like RIC / RITE devices, the receiver is placed in the ear canal, however, it is better protected than the receivers in RICs. Again this placement exposes not just the receiver but all of the electronic components including the microphones to the hostile environment that the ear. The manufacturers take great pains to protect both the receivers and the microphones. However, unless you take good care of your hearing aids, changing your wax guards when you should and cleaning the microphones, you are looking at possible failures.

At best, wax or dirt can just block the sound outlet or microphone inlet, at worst, it can make its way into the components itself and destroy them. As we said wax and moisture is the kiss of death for electronics. The manufacturers have done a good job of protecting those sensitive components in most cases. It is very rare for anything other than the microphone or receiver to fail, chipset failures are that rare that they are remarked upon with surprise. In the case of custom hearing aids, if there is a failure they will have to be sent off for repair which can take varying amount of time. If the failure is within warranty it will be repaired free of charge, if not, you will have to pay a fee. If you are having them repaired regularly, the cost adds up.

The key to success with these hearing aid types is a good clean and care routine that involves drying. The better you take care of these hearing aids, the better they will perform. Again, I don't want to put you off this device types, they are fantastic devices and I really like them. If you are recommended this type of device just be aware of the inherent issues. As we said, many of the hearing healthcare professionals we partner with can arrange a five year manufacturer's warranty to cover repairs. Some may charge, some may actually offer it for free. If you are considering buying custom hearing aids, ask about an extended manufacturers warranty.

### **Maybe Too Small!**

Some of the custom hearing aids are very small and discreet devices, as with RIC

/ RITE devices, the smaller the device, the smaller the battery they use. With the smaller custom devices, the size of the hearing aid and the size of the battery can cause difficulties for people with dexterity issues. If you have difficulty handling the hearing aids or putting the batteries in, what should be a joy can easily turn into a frustrating task. The larger custom devices are easier to handle and use larger batteries that are easier to handle.

### **Contra-indications To Wearing Custom Hearing Aids**

As with RICs and RITE devices, there are some people who shouldn't wear these type of devices. It is pretty much the same as RICs, if you have permanent perforations in your ears or you have had a mastoid operation these hearing devices aren't really for you. The same can be said for people who suffer with wet ears or produce a large amount of earwax, either conditions will cause issues for the hearing aids. Even though the power output has been increased greatly with these type of hearing aids, they still might not be suitable for your hearing loss. If they aren't, don't let vanity win, get a hearing aid that is suitable for your hearing loss. That will translate into better hearing which will help you lead a better life. You can read about the [maintenance and care of ITE hearing aids here](#).

# BTE (Behind The Ear) Hearing Aids

We love BTE hearing aids, probably the most reliable hearing devices you can buy. Let's take a deeper look at them.



# Behind The Ear Hearing Aids

## BTE HEARING AIDS

Behind The Ear or BTE hearing aids have been around for a very long time. In the recent past they have got smaller, more versatile and more powerful.

Behind the ear hearing aids are self contained units with all of the components in the case. Over recent years they have gotten much smaller than they once were. They are hugely versatile devices and they will fit nearly every hearing loss.

Normally the manufacturers will make different styles for differing losses, one for most losses from mild to severe and one usually labelled a super power for profound hearing loss. Even the super power devices have become quite small in comparison to the older styles.

The hearing aid is connected to the ear through a coupling, in some cases it is via a tube and ear mold, in the case of the hearing aids to the left it is with a thin tube and instant fit tip. The actual fittings are varied and usually based on hearing loss.

## THE PROS & CONS OF BTE HEARING AIDS

We are finding it hard to think of disadvantages really, but we will give it the old college try. Let's take a look at what you can expect from BTE devices.

### What Are The Advantages Of BTE Hearing Devices

#### Fully Functional Hearing Solutions

BTE hearing aids nearly always have a full load of hardware including volume controls, programme buttons and telecoils. The telecoil is a useful addition if you want access to loop systems in public buildings like churches, conference centres, the post office. In fact many taxis in London are fitted with loop systems. Even though wireless communication systems in hearing aids is now the norm, the telecoil is still a good thing to have. The only issues that occur in relation to it is how well the loop system is working or how well it has been fitted.

#### Extremely Reliable Hearing Aids

BTE hearing aids are probably the most reliable of hearing aids, they very seldom fail. Because all of the components are encased in the hearing aid and the hearing aid is worn at the back of the ear, very little or no wax or moisture can get at them. When something goes wrong with a BTE it tends to be either the physical controls or the microphones. Nearly all of the manufacturers have introduced new types of



microphone covers that almost completely enclose the microphones. So even microphone failure maybe a thing of the past.

### Easy To Use

BTE hearing aids tend to be easy to handle and place in the ear, so for people with dexterity or vision issues they are a good choice.

## What Are The Disadvantages of BTE Hearing Devices

### Haven't a Clue

We are wracking our brains here and really can't think of anything, maybe discretion? Even that isn't really true, a small BTE with a thin tube is a very discreet hearing aid to wear. It would be almost as discreet as many of the RIC / RITE devices. Okay the larger BTEs are not the most discreet, but personally I would always go for long term reliability every time. A hearing aid is of no use to you if it is broke and BTEs very rarely break.

### Contra-indications To Wearing BTEs

Sorry again we are stuck for any here really. Read about [BTE care and maintenance here](#).

# Hearing Aid Technology levels

Hearing aid technology levels can be confusing, here is what you need to know

## LET'S TALK HEARING AID TECHNOLOGY

Once upon a time there was three hearing aid technology levels, what were known in the profession as low end, mid range and high end. Then most of the hearing aid manufacturers introduced four, loosely they are called, basic, standard, advanced and premium and that is the designations I will use here for clarity. Let's take a look at those levels and what you can expect from them in general.

Every couple of years a hearing aid manufacturer releases a new product range, once it was every four years but it seems to have accelerated to every two years. For clarity, a product range may be referred to as a chipset, a platform or a family by differing people within the profession. Each new product range will have four levels of technology. We said that there used to be three technology levels in hearing aids but that had changed, we kind of feel what the manufacturers have done in most cases is actually split the mid range into two levels.

A lower mid range which is what we are calling standard and a higher mid range which is what we are calling advanced. Normally within each technology level there will be every hearing aid type that they produce. For instance, Widex have introduced their new product range the Unique, the Unique product range is based on the new Unique chipset and it has four levels of technology,

the 440 which is top of the range or premium technology, the 330, the 220 and the 110 which is the basic level of technology.

Each of those Widex technology levels have a full family of hearing aids including custom, BTE and RICs. Nearly every manufacturer offers hearing aid products in this manner, some use different names to mark different technology levels but most use some sort of name and numeral combination. Phonak like to confuse everyone by giving their hearing aid types different names, but at least they stick to the numeral using the number 90 for their premium top of the range devices, 70, 50 and finally 30 for their basic level.

## How Hearing Aids Work

Before we launch into the different levels of technology, let's talk quickly about what hearing aids are. Hearing aids have changed dramatically over the last few decades with the advent of digital technology. At their core, hearing aids have always been made of the same four basic parts: a microphone, a processor, a receiver (the speaker), and a power source (the battery). In simple terms, the microphone picks up the sounds and passes it to the processor. The processor enhances the signal in accordance with it's programming and delivers it to the receiver which delivers the amplified signal to the ear canal.

The power source delivers the power needed to make the magic happen. The introduction of digital technology transformed hearing aids allowing manufacturers to introduce ever more powerful processors in smaller packages. In modern hearing aids, the signal picked up by the microphone is converted from analog to digital before being processed, this allows for a much deeper manipulation and enhancement of the sound. This manipulation is how noise reduction and other hearing aid features work. The signal is then converted back from digital to analog before the receiver delivers the enhanced signal into the ear canal. It is nearly impossible to get an analog hearing aid now, it is a special order, virtually all of the hearing aids manufactured in the world are now digital.

### Basic technology hearing aids

Each manufacturer has a basic level of technology, they may not call it exactly that but for clarity that is the label it is getting. This level of technology is designed to work for people who are relatively sedentary (don't get out much). As I have said, this might be the basic level but it will still be on the latest

chipset available from the manufacturer. Basic level hearing aids are usually just that, quite basic, they will have features such as directional microphones and maybe even some noise reduction, more on both later, but generally they will be basic and they will be manually controlled. However, that is beginning to change, Phonak has just introduced their latest Venture platform and the basic hearing aid technology the V30 is an automatic hearing aid. It is limited to only two sound situations, but that is an interesting development none the less.

### **Lifestyle help from basic hearing aid technology**

You can expect basic technology to help you in less complex sound situations. That means that you can expect to hear well in one to one conversations, even if the person is talking to you from another room (within reason, if you own a thirty bedroom mansion, all bets are off). You can also expect them to help you with small groups, family around the kitchen table for instance. They should also help you with TV and Radio, although both can be a little difficult because of the quality of audio from different stations. Depending on the car you drive, this level of technology should also help you with understanding conversation in the car.

Well programmed basic hearing aids will help you somewhat in limited noise. If you take the time to learn coping strategies like turning your back to noise and seating yourself in a way that minimises noise. However, once the noise level rises, they will begin to let you down. This is where our love of wireless accessories comes in, if you use a remote microphone accessory with a basic level of hearing aids it will really help you in noise.

It will give you that extra bit of help you need to hear your companion, it will also open up other opportunities to hear better in different situations. In the car you simply hand the remote mic to your passenger and you will be able to hear them quite clearly. Having issues with the TV? Put your remote mic down by the speaker, or use the cable that comes with it to plug into the audio out of the TV. By no means is it a replacement for higher technology hearing aids, but when you are working within a budget it can give you the extra edge you need.

## **Standard technology hearing aids**

Again, each manufacturer has a standard level of technology which is second from the bottom. These devices are aimed at people who are a little more active. The features in these hearing aids will be slightly better than the basic

features and are designed to help you hear in slightly more challenging sound situations. This level of technology is designed for someone who is more active in their life. This level of technology has dramatically improved over the years, to give you an idea, the current hearing aids at this level would easily be as good as flagship models from five years ago.

### **Lifestyle help from standard hearing aid technology**

You can expect all of the help that a basic hearing aid would deliver but better, and on top of that you can expect help in group situations, small meetings, out and about at the shops and in restaurants. Again, this is based on the noise levels present, this level isn't going to help you to hear well in a very noisy restaurant on a Saturday night, think moderate levels of background noise in most situations. Again, wireless hearing aid accessories can make up for any difficulties in different situations and you should also consider them. We believe they are worth the extra expense in most cases.

## **Advanced technology hearing aids**

This level of technology is ideal for active people delivering good sound quality and speech clarity in most situations they will find themselves in. This level of technology has dramatically improved in the last few years, it seems that most of the manufacturers are keeping a lot of their top end technology features in the advanced ranges. They are dumbing them down slightly, but not much, it has been interesting to watch especially over the last year. For instance, the Widex 330 is almost as good as the 440 range and the Phonak V70 is almost as good as the V90 range. There are clear differences between them and there are valid reasons why you would choose the higher end technology but they are close nonetheless.

The main differences between this level and the next up is the binaural processing of hearing aid features. Put simply, hearing aids work exceptionally well when they make decisions as a pair, this extends to the features involved in delivering better hearing. In the flagship models of all brands most of the features are applied by the hearing aids in a combined and consolidated manner because of the communication between both hearing aids. This really does deliver the best and most natural sound and clarity. Advanced technology level hearing aids may have most of the top end features, but they don't work together in that combined way, nevertheless, they are exceptional hearing aids generally.

### **Lifestyle help from advanced hearing aid technology**

Again, you can expect all of the help you get from the two previous levels of hearing technology but better. Advanced hearing aid technology can be expected to assist you in even complex sound situations, especially if you use coping strategies well. Usually at this level you can expect real help with hearing better in situations like large auditoriums, open plan buildings like churches. You should be able to hear quite well at the theatre, music should be a far better experience. In general, speech clarity in noisier situations should be pretty good. So if you are an active individual who likes to socialise, goes to some meetings and gets out and about to social events, these may well be the hearing aids for you. We know we are boring you with our obsession with wireless accessories, but hey good honest advice remember? Yes, wireless accessories that are chosen with the situations you really want to hear in will help you even more.

## Premium level hearing aids

This level of technology is where the hearing aid manufacturers deliver all of their very latest features. This level of technology is for people who simply have to hear well in almost every situation. They are designed to handle the most complex sound situations and deliver the best speech clarity and most natural sound. In this level the hearing aids will truly work as a pair, deciding on how the sound is processed to deliver the very best hearing possible. The decision making process and the application of the hearing aid features is undertaken in a binaural manner and because it uses the power of two separate processors these are always the most powerful hearing aids available (in computing power).

### Lifestyle help from premium hearing aids

Pretty much what you would expect, everything that the rest can do but exceptionally better. Premium hearing aid technology is designed to deliver the very best possible hearing and speech clarity in even complex sound situations. These type of devices are designed for active people who need to hear well everywhere. Remember though, even at this level of technology you will not be delivered super hearing, hearing aids are designed to give you the best experience with your residual level of hearing. They are not designed to, nor can they give you back your normal hearing or better than normal hearing. Oh and yes, wireless accessories are still an option worth thinking about even at this level.

# Hearing Aid Features

Hearing aid features can be confusing, we hope that we can clear up the confusion with some plain language

## Let's Talk Hearing Aid Features

Technology levels and hearing aid features are linked, the better the technology level, the better the feature that is used. The feature set of any hearing aid is dependent on the level of technology of the hearing aid and the manufacturer. The flagship or highest technology hearing aids from each manufacturer have the best feature set available from them. First of all, when we speak about features in the profession, we are usually not talking about physical features but hearing aid algorithms or mini programmes that run on the processor. The easiest way to understand is compare it to a smart phone, a smart phone runs on an over all system like Google's Android or Apple's IOS, however within that system there are apps available to you that do different jobs.

Hearing aids and their features are not unlike that concept. Many people get a little snowed under when they try to understand features and we can understand that. Modern digital hearing aids have a ridiculous amount of different features that are designed to deliver differing levels of benefit to hearing aid users. All [modern hearing aids](#) will have some mixture of different level of features so we are going to try and investigate them and tell you in plain language what they actually do. Please forgive me in advance, I am a nerd and this stuff excites me.

# What are the real world benefits of hearing aid features?

As I discuss the hearing aid features I will try and translate them into real world benefits for you. Just explaining what they are and what they do is simply not enough. So without further blah, let's have a look.

## What are audible indicators in hearing aids?

Right at the basics, an audible indicator informs you of some sort of change in the hearing aids you are wearing. For instance, if you change the programme, or if the volume control has changed or that your battery is running low. In most hearing aids these tones are usually a beep or melody type sound.

**Widex** are one of the only manufacturers that employs real speech to announce the programme that you are on and whether your battery is low. They have even made this feature available in many world languages. This is a clear indication of why Widex is a little different to everyone else, they think clearly about the little details that would help. They are one of the very few manufacturers to use this feature and it is available across their range of hearing aids no matter what the technology level.

### What's the advantages for you?

Audible indicators allow you to know what is happening in your hearing aids at any one time, for instance you enter your favourite restaurant and it is busy. You know that your hearing health professional has set up programme two for just this very situation, so you switch your hearing aids to it. You hear the two audible beeps and you know immediately you are at the right settings. It is still a bit loud though, so you turn down the volume a bit, the sound of the descending beeps let you know it is working. Simply put, audible indicators allow you confidence that you are using the hearing aid properly.

## What are listening programmes in hearing aids?

Many hearing aid manufacturers offer listening programmes in their hearing aids. What they are is a differing number of pre-set listening situations that are programmed into hearing aids. Each listening programme has its settings optimised for different listening conditions / sound environments. The different listening programmes can then be selected by the user using a switch or push button on the hearing instrument or via a remote control The listening



conditions are usually set as speech, speech in noise, music and acoustic telephone.

### **What's the advantages to you?**

Apart from the obvious one of offering better hearing in differing situations there are other advantages. For instance, your hearing healthcare professional can make adjustments for just one situation in isolation without making global changes to how the hearing aids work. This means that they can target changes to help you hear better in the situation you are having a problem with, without affecting the working of the hearing aids in other situations where you are doing fine. In essence, the more programmes, the better the customisation of the hearing aid for you.

For a real world instance you leave the house in the morning with the children in the back of the car, so you change the listening programme to the one that focuses to the back so you can hear them clearly, all though in fairness after you did it, you wish you hadn't!. After dropping them off you have to meet your friend in the coffee shop, the shop is busy so you use the programme that has been set up for noisy environments so you can hear her clearly. You are really glad you did because she has some great news to share with you and you can hear it clearly. That is the benefit of listening programmes.

## **What are automatic programmes in hearing aids**

Many manufacturers offer differing levels of automatic programmes, what they do is automatically select the optimum instrument settings without the user having to push a button or use a switch. The management systems of the hearing instruments analyse and identify the current sound environment. The management system decided what is the best set of parameters for you to hear better in that sound situation and then automatically switches the parameters within the hearing aids to the appropriate settings. The amount of automatic programmes on any hearing aid is dependant on the manufacturer and the technology level.

### **What's the advantages to you?**

Automatic programmes deliver real advantages, in essence the hearing aids are always working to deliver the best possible sound quality no matter where you are. They do so seamlessly and without any input from you, which means you can just concentrate on getting on with your life. In most manufacturer's hearing aids these automatic programmes can also be individually altered or fine tuned for your preference.

Most hearing aid manufacturers would also offer manual listening programmes along side their automatic function. Again this delivers the benefit that your professional can deliver the exact customised settings you need for just one situation.

## Binaural synchronisation

Binaural synchronisation is something that has only recently entered the lexicon of hearing aid terms with the advent of wireless communication between hearing aids. In essence it means that the hearing aids communicate wirelessly to ensure that the settings are synchronised.

### What's the advantages to you?

It is a hugely useful feature that was introduced several years ago. At it's most basic, this feature ensures that the current user settings are synchronised across the two hearing aids. So if you make a change on one hearing aid, such as the changing the listening programme or volume control setting by touching the button. It is automatically changed on the other to reflect this. This means that the two devices are always in the same programme and at the same volume level.

However, it is at it's most advanced where it dramatically improves the lives of hearing aid users. Binaural synchronisation at it's most advanced makes sure that every feature of the hearing aid is working in a combined manner to deliver the very best listening experience. This really is exciting stuff because it is responsible for the huge advances in hearing aids in the last few years. It is also the reason why hearing aids have become more natural sounding (told you I was a nerd). When someone speaks about this technology to you, be sure to be clear exactly what it synchronises.

## Binaural Compression

Again the advent of this feature was enabled because of the advances in wireless communication in hearing aids. Widex were first to introduce it in their flagship Clear hearing aids in 2009. Most of the manufacturers have followed suit in more recent times introducing the feature under differing names.

Hearing aids that use binaural compression work as a combined system to deliver enhanced sound as naturally as possible. This is achieved by using

both hearing aids to assess the surrounding sound environment. This information is then shared between and used by the hearing aids in a combined manner. This mass of information allows the hearing aids to make decisions on sound output as a true pair or system.

### What's the advantages to you?

The system uses natural sound cues such as temporal effects (time differences in sound) and the head shadow effect (differences in sound from one ear to the other) to assess exactly what is going on in the sound environment. It then re-produces those sound cues in the enhanced sound you receive to deliver the most natural sound experience. All of this happens instantaneously without time lag. Because the natural sound cues are preserved, your brain gets the optimum information possible in order that it can do, what it does naturally. Remember, the ears just carry sound, it is the brain that makes sense of what you are actually hearing. I really think that this is the most exciting feature that has been released in recent times. As this feature evolves, it will make hearing aids better and better, achieving benefits for most users that were un-imaginable.

## Compression channels

Compression channels have kind of fallen out of favour in the recent past as a sexy talked about feature because of two reasons. The first is that they are actually hard to explain without resorting to gobbledegook and the second being that sexier more understandable features have come about. However, they are still fantastic features and it is worth me trying to explain what they are. Okay, this is pretty technical stuff, but I will give it a go to make it intelligible. Compression channels are designed to change how different frequencies of sound are amplified. Compression channels are divided into a number of channels that are used to restrict or change differing levels of amplification within one sound frequency. For instance, you may have problems hearing sounds below 40dB in one channel.

However, the amount of amplification we need to deliver to you to hear those sounds clearly is radically different to the amount of amplification that we may have to add to a sound of 65 dB. Compression channels allow us to add varying levels of amplification to varying volume of sounds. The feature is used to programme the hearing aid to amplify or reduce the range of noises that you hear. This feature simply allows us to customise the hearing aids to your hearing loss in a better manner. Some hearing aids have more channels/bands than others.

### What's the advantages to you?

Simply a better customised hearing aid which is the foundation that everything else relies upon.

## Data logging

Data logging is a feature which records different sets of information during the hearing aid's use. Most hearing aid manufacturers offer data logging of one type or other with differing levels of data captured. This information is available to be analysed by the hearing professional when they connect to the hearing aids. This type of information allows a professional a deeper understanding of your experiences.

### What's the advantage to you?

It can assist in the fine-tuning of the aid to your preferences. The data recorded includes the hours of use, the types of listening environments you were in, the listening programmes you used and any volume control changes during that period. Data logging delivers information that helps the hearing professional to programme the hearing aid to your specific requirements. Anything that helps the programming of your hearing aids to better suit you, has to be seen as a good thing.

## Feedback cancellation in hearing aids

Feedback is the horrible whistling that is most associated with older hearing aids and used to be the one of the biggest complaints of hearing aid users. Feedback is caused by amplified sound being re-processed, in other words sound emitted from the receiver (speaker) is re-processed through the hearing aids and it shrieks. This is exactly the same thing that happens when a microphone is put too close to a speaker.

The underlying cause of feedback is the escape of sound from the ear canal. There are many reasons for that, it can be due to a poor fitting of an ear mould or in-ear hearing aid, which allows amplified sound to escape. Earwax blockage is another frequent culprit for hearing aid feedback. Another cause of feedback is close proximity of the hearing aids to something, for instance if you place anything over your ear, a hand or hat or a person hugging you.

Feedback cancellation is a feature that identifies and stops feedback, how it does it changes from manufacturer to manufacturer and within technology levels. Suffice to say, each feature identifies the feedback and which

frequency or frequencies it is occurring in. It then removes the feedback from the signal and stops the whistling. Different features do this in different ways, I won't bore you with the technical details, but if you really want to know, drop us a line and we can explain.

**What's the advantages to you?**

Simply put, your hearing aid doesn't whistle, you don't get embarrassed and your hearing aids work better.

## Adaptive feedback cancellation

This is feedback cancellation on steroids, it is able to automatically adapt its speed of operation to improve its performance, for example it can change how it works when you are using a telephone, listening to music and suddenly hear alarm beeps. The telephone needs strong feedback cancellation, the music situation needs very little feedback cancellation because musical notes can sound like feedback and alarm beeps is a similar concept.

## Directional microphones

Directional microphones completely changed how hearing aid users can hear in noise. Directional microphone features use the sound information supplied by two microphones, to allow the computer brain of the hearing aid to identify sound that is coming from the rear and sound that is coming from the front.

This allows the processor to reduce the level of sound coming from the rear and concentrate on the sound coming from the front. Modern directional microphone features actually enable you to change the direction of hearing as you require. You can change the focus of the hearing aids from all-round sound to being more focused on a single person or object to the front side or rear.

**What's the advantages to you?**

Simply put, directional microphones are a proven method for hearing well in noise. So they are an invaluable feature for you to have.

## Adaptive directional microphones

Yes, you guessed it, directional microphones on steroids! This feature allows the null of the directional microphones to adapt, the null is where the noise source is. So the microphones detect the location of the strongest noise source and adapt the sound to reduce your perception of that noise. If the

noise source moves the the system adapts to keep that noise source reduced. Most of the modern adaptive systems work in more than one frequency band, meaning that they can help to reduce your perception of several different noises at one time, even if they are all moving at different positions once they are at differing frequencies.

**What is the advantage to you?**

Bigger, better proven method to help you hear in noisy environments!

## Automatic directional microphones

This is feature just automates the directional microphones completely, it allows the processor to select how it will use the directional microphones according to the sound situation you are in. In a quiet situation they will operate in an omni-directional mode (taking in sound from all around) and directional mode or adaptive directional mode if available, when a noise source is introduced.

**What's the benefit to you?**

Complete automation of what is an outstanding feature, you get to hear well in every situation without any input. It just happens automatically. each manufacturer has it's own flavour of directionality, where possible we will explain what it is clearly.

## Frequency bands in hearing aids

Again, like compression bands or channels this one is a little bit in depth. Frequencies as we will discuss them here are the way that sound is split. The total frequency range of a hearing instrument is divided into a number of bands or channels in which the gain that is provided can be customised to your hearing loss. A quick but worthwhile side note here, the frequency band width of hearing aids can be very different. What that means is that the amount of sound frequencies that a hearing aid can process can be very different from manufacturer to manufacturer.

Some hearing aids can only process sound frequencies between 200 hz and 6 Khz, others can process between 100 hz to 11.5 Khz. Why is this important I hear you ask, while human speech is normally between 200 hz and 4 to 6 Khz, for the full and rich enjoyment of music, a much wider bandwidth is more desirable. Hence, if you are an audiophile, you might well appreciate the wider bandwidth.

Back to frequency bands, each manufacturer is different, some hearing aid manufacturers call them bands and some call them channels and some manufacturers offer more than others. The bands allow your professional to programme the hearing aid in a more customised way for your hearing loss. The more frequency bands that the aid has, the finer the programme can be, so you end up with crisper, clearer hearing.

Most features of hearing aids work within the bands, so the more bands there is in the instrument the more bands that the features in the hearing aid work across. How many bands are best? There is a lot of debate about that, but it is generally agreed that any amount between fifteen and twenty is optimal, that's why you will find most flagship hearing aids have numbers of channels or bands in that range. For instance Widex flagship hearing aids have fifteen channels, however GN ReSound believe have seventeen channels.

### **What's the advantage to you?**

The more frequency channels or bands a hearing aids have the better, although after twenty the benefit starts to fade. The more channels or bands, the better the customisation and the better experience that other hearing aid features will supply. Simply meaning that you will receive optimal benefit from your hearing aids.

## **Hearing aid noise reduction**

This is probably the feature that drives most interest, it is often discussed as a feature that makes speech clearer in noise. Generally, it actually doesn't quite do that exactly. Only one manufacturer, Widex, have actually ever produced a noise reduction feature that affects signal to noise ratio. Signal to noise ratio or SNR to geeks like me, is used to measure the ratio of signal (speech) to noise. So the actual measure of any feature that helps you to understand speech should be SNR.

What most noise reduction features actually do is to reduce the amplification of non-speech sounds in an effort to allow better understanding of speech sounds. This tactic makes it more comfortable for a user in noisy conditions by reducing the background noise, for example in traffic noise in the street, a busy pub or restaurant. There is a lot of evidence that this reduces fatigue, reduces the amount of concentration you have to have and therefore actually does help you hear speech a little clearer. As with all features, not all noise reduction is the same and the more high end technology has better strategies to deal with noise.

### **What's the advantages for you?**

A better chance for you to understand speech in noisier environments, in combination with a good directional microphone system it will dramatically improve your experience.

## **Speech enhancement**

Speech enhancement is another feature designed to help you hear speech clearly in noise. It is used in combination with noise reduction to better help you to hear those important speech sounds. The processor in the hearing aids identify speech signals and enhance or amplify them. It analyses sound signals and, where most noisy maximises the speech signal.

### **What's the advantages for you?**

In combination with noise reduction and directional microphones it allows you the best opportunity to hear speech in noisy sound situations.

## **Transient noise reduction**

This is simply a noise reduction feature that concentrates on identifying and suppressing impact or sudden sounds, such as shutting doors, clattering dishes and glass breaking. The feature is designed to do it without affecting the speech clarity. It is known by many names across different hearing aid manufacturers. No matter what it is called, it allows the hearing aid to process sudden or loud noises in a more comfortable way for the user.

### **What's the benefit for you?**

A much more comfortable listening experience for you as you go about your daily life.

## **Wind noise reduction**

It is exactly what it sounds like, it is a noise reduction system that reduces the sound of wind cavitation on the hearing aid microphones. This feature is particularly useful for people who like to be in the outdoors. So if you are a golfer, or a hiker, it is something that you should consider.

### **What's the benefit for you**

It will make it much easier for you to tolerate being outdoors, if you are an outdoorsy type, golf and such things, it is an invaluable feature.

I have covered much here and I hope I have made it clear and easy to read,



however, if I have not, or if you are looking for more information, don't hesitate to contact us with your questions.



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