

## Custom Solutions for a Customized Experience



A Sonova brand



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## Disclosure in accordance with CEU guidelines

- Cheri Hebeisen, is a clinical trainer with Phonak. She joined Phonak in 2011. Cheri earned her Doctor of Audiology degree in 2003 from the University of Florida and her Masters of Communication Disorders in 2000 from Louisiana State University Health Science Center in New Orleans. Prior to working as a trainer for Phonak, her clinical experience included diagnostics for pediatrics through geriatrics, newborn hearing screenings, hearing aid and FM fittings, as well as, auditory processing disorder evaluations.
- Financial- Phonak employee who receives a salary for employment.
- Nonfinancial- No relevant nonfinancial relationships exists.

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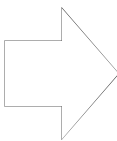
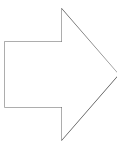
## Learning Objectives

After this course, participants will be able to...

- ...list uses and benefits of custom instruments in a predominantly RIC market.
- ...identify the best custom solution for appropriate patients.
- ...identify the benefits of Biometric Calibration.

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We have come a looooong way....



Audéo B-10

Audéo B-312

Audéo B-312T

Audéo B-13

Audéo B-R

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For people who live life with energy and passion, Phonak is the brand that is continuously pioneering hearing solutions that are life-changing.



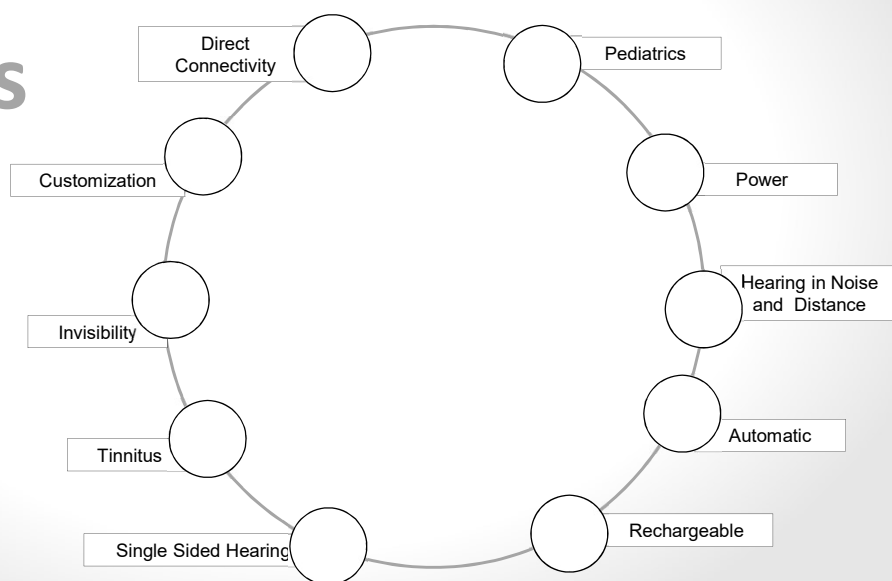
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**By creating leading hearing solutions that empower people to thrive socially and emotionally.**

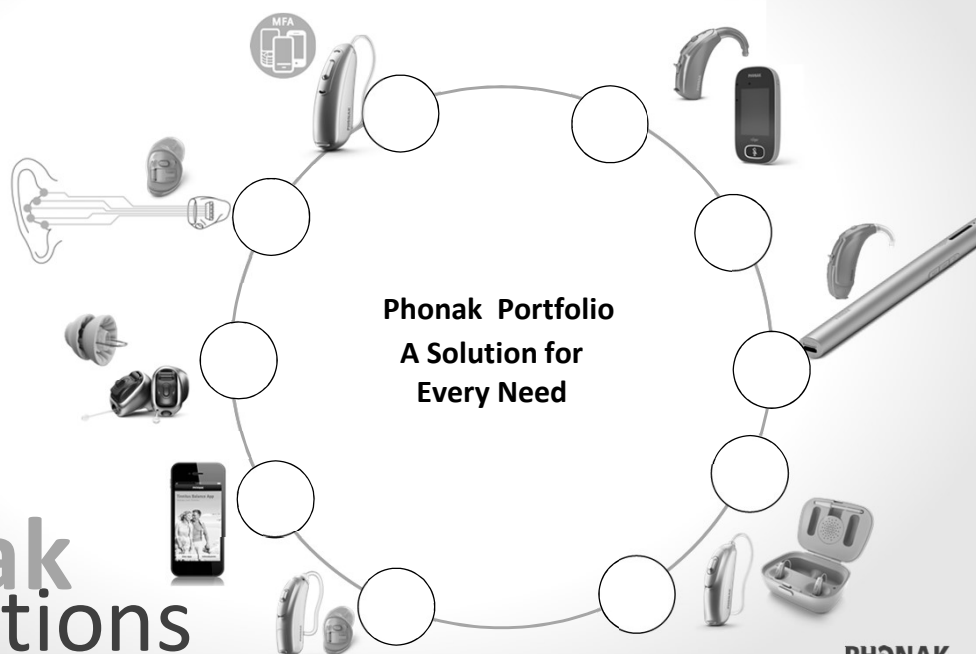
**We offer the broadest portfolio of innovative hearing solutions**

# Patient Needs



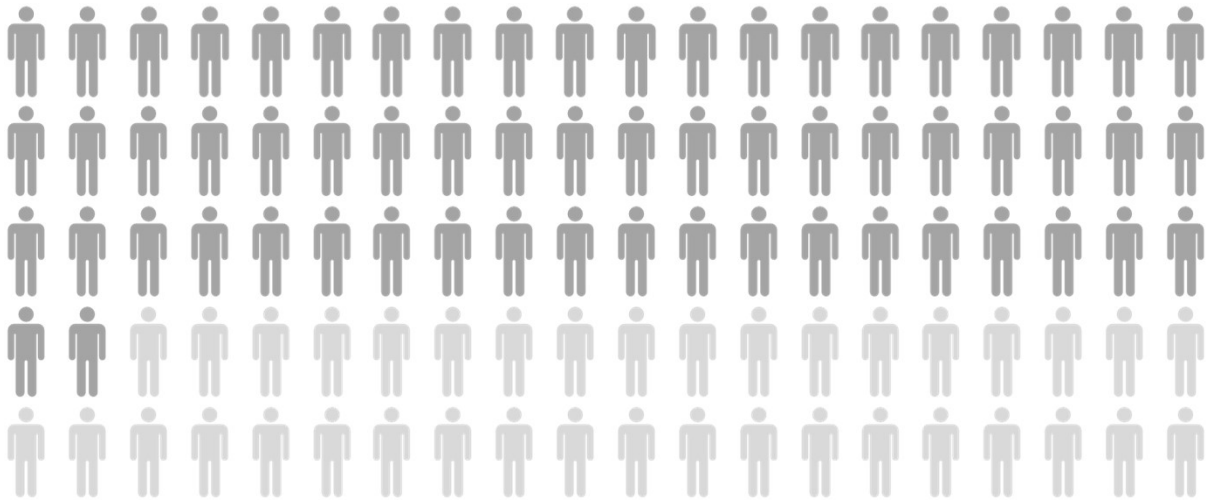
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# Phonak Solutions



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## 62% of client's first choice is an invisible device



Phonak needs survey, Project #862, March-April 2016, N=160

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## Discover the benefits



### High-tech titanium custom hearing aids

- The **smallest** Phonak custom products ever
- Made from **medical grade titanium** using sophisticated 3D printing technology
- **64% increased** IIC fitting rate<sup>1</sup>
- Up to 26% smaller thanks to
  - 50% thinner shell
  - Smaller electronics
  - Battery module with integrated microphone

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## Microphone integrated battery module saves even more space

no more  
MicGuards

microphone



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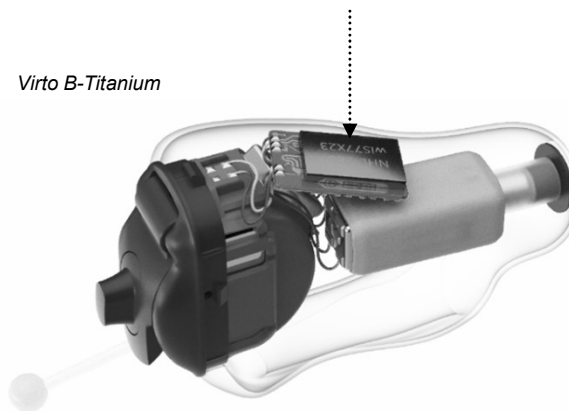
## As small as it gets

*Virto V-nano*



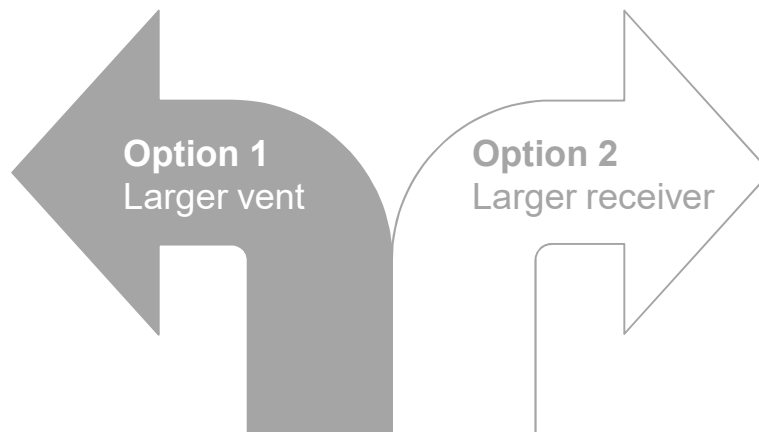
*Virto B-Titanium*

60% smaller  
electronics



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Additional space = Options for fitting



*Without an increase in size vs. current IIC solutions*

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More venting without an increase in size



*Virto B-Titanium*



*Virto V-nano*

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## Additional venting options



- **Default** venting
- Optimized for size and performance
- Best for **size priority**



- **Additional** ordering **option**
- Optimized to reduce occlusion
- Best for **comfort priority**

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## More power without an increase in size



**60%**  
IIC fit  
rate with SP  
receiver


*Virtio B-Titanium*



*Virtio V-nano*

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Phonak Virto™ B  
With Biometric Calibration



A black and white photograph of a middle-aged man with a beard, smiling and looking towards the camera. He is positioned next to a biometric scanner. The scanner's screen displays a fingerprint being scanned and the text "ACCESS GRANTED" in large, bold letters. Above the scanner, there are several small digital displays showing various numbers and icons. In the background, a group of people in formal attire are standing in a line, and several airplanes are visible in the sky.

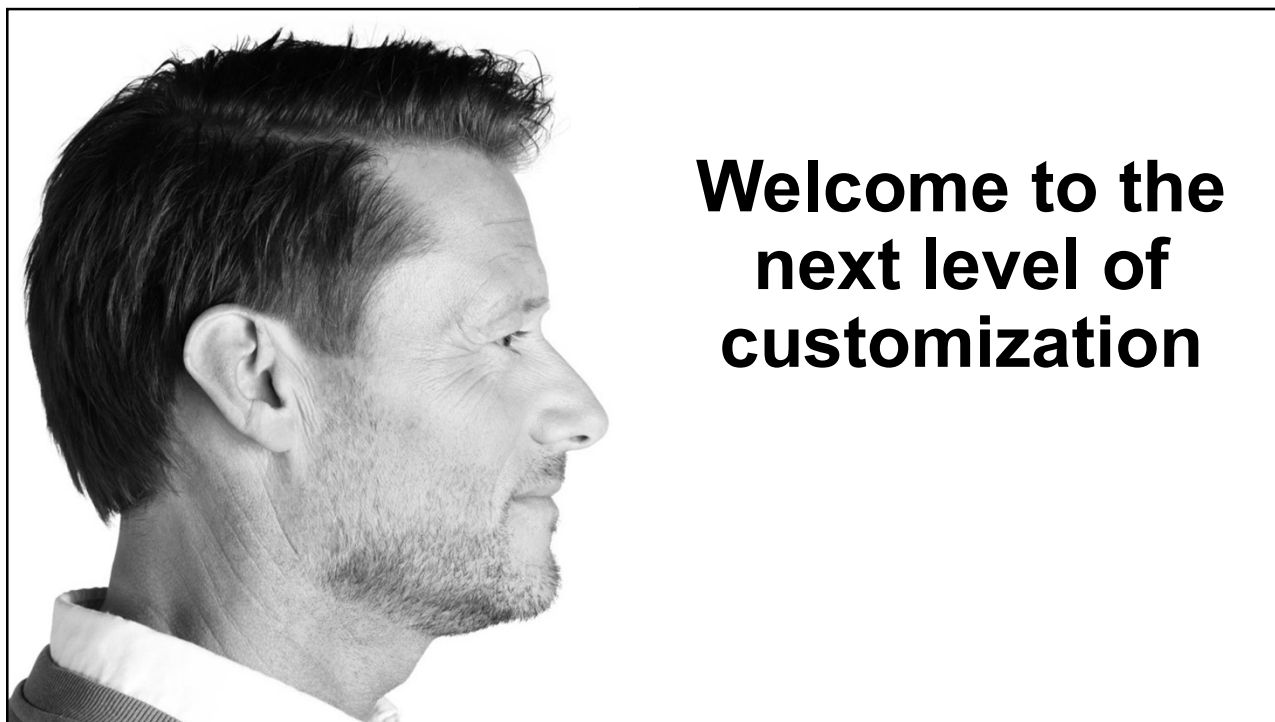
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70 years PHONAK  
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A black and white profile photograph of a man's head, facing right. The image focuses on the ear and the side of the face.

Each ear is unique, each ear  
hears differently



### **YESTERDAY**

Physically customized on the outside



### **TODAY**

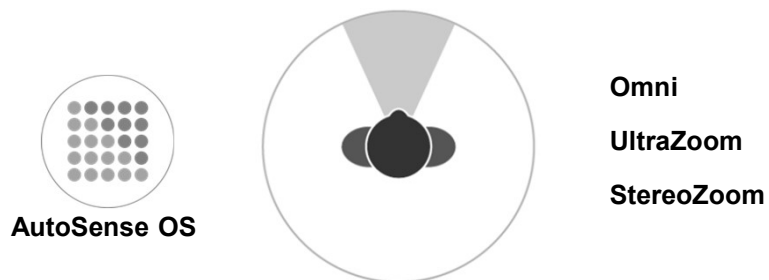
Physically customized on the outside



**and acoustically customized  
on the inside**

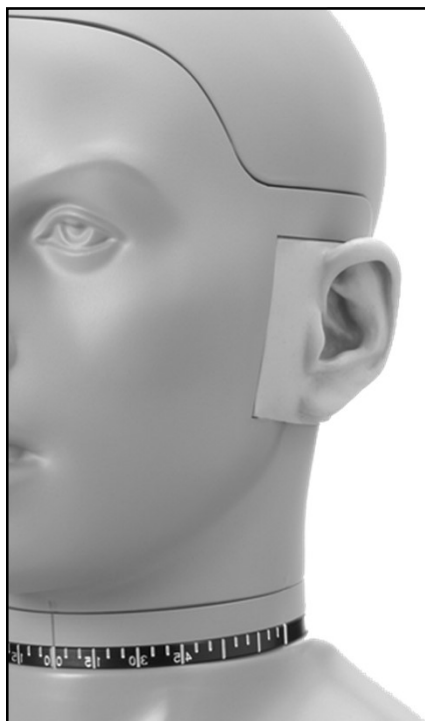
Let's talk about beamformers

It **automatically** begins to blend into a **more directional beam former**

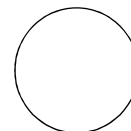


**Results in improvement in signal-to-noise ratio**  
in noisy environments

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**Currently:  
microphone depth  
calculations based  
on KEMAR**



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## Phonak Virto B: The world's first hearing aid with Biometric Calibration

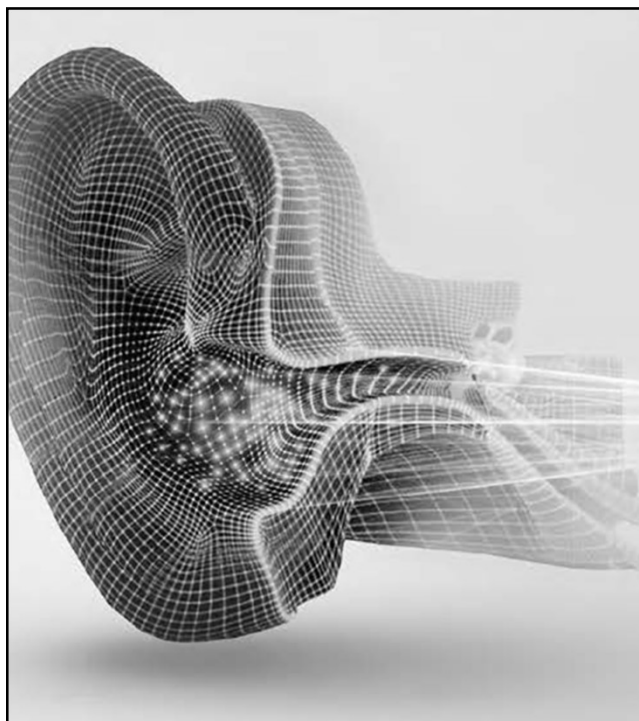


- **Precisely calibrated** to your clients' individual ear
- **2 dB improvement** in directionality
- **Fully automatic** for effortless listening everywhere

When a biometric hearing aid gives you access to better hearing performance,  
**life is on**

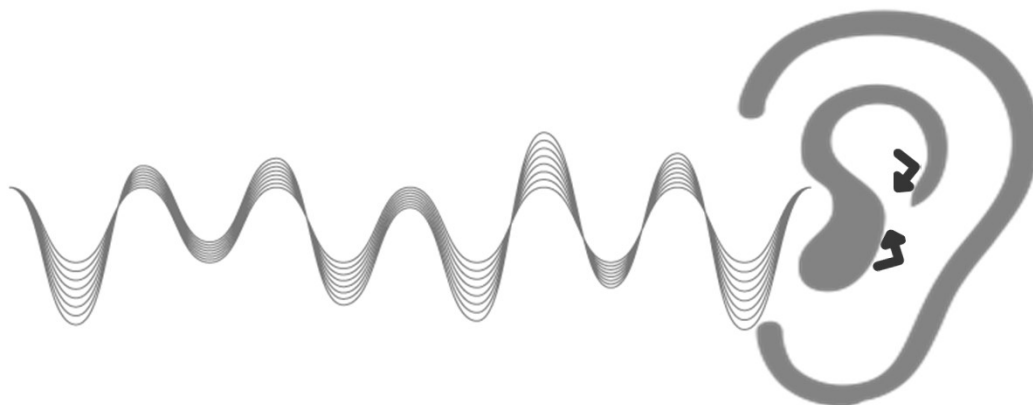
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**How does Biometric Calibration work?**

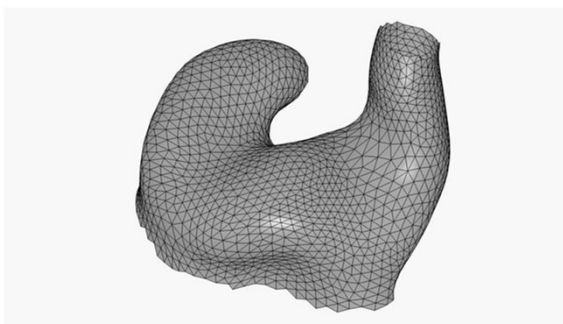
Virto B: concha reflections are known



Reflections are known and taken into account to calibrate the device

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How Biometric Calibration work?



- Client's **biometric data points** are compared to a general ear model
- Then **an algorithm determines the differences (delta)** between the model and the individual's anatomy
- Then the beam former is **permanently calibrated to the client's anatomy**, rather than the general ear model

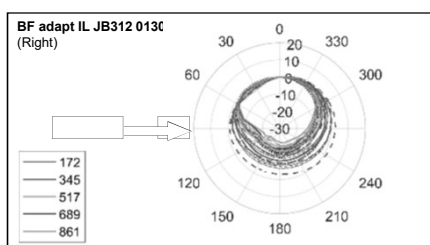
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## Biometric Calibration **process**

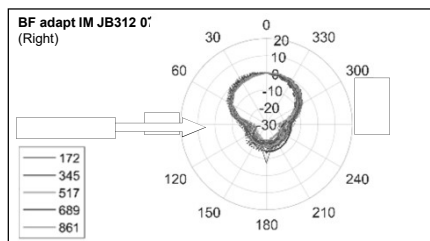
1. It all starts with a complete **ear impression**
2. **3D scanning** of patient's ear impression
3. Over **1600 biometric data points extracted and saved** into the modelling software
4. The algorithm knows how the ear reflects sound so it **adjusts the polar plot** to the optimized cardioid for their ear
5. Resulting beam **improves directionality by 2 dB** in UltraZoom compared to without Biometric Calibration

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### Without Biometric Calibration



### With Biometric Calibration



Biometric Calibration  
provides a 2dB  
improvement in  
directionality leading to  
**better hearing  
performance**

Innovative beamformer leverages new hardware

### Benefits of the PU mic

**Durable** to  
environmental  
impact

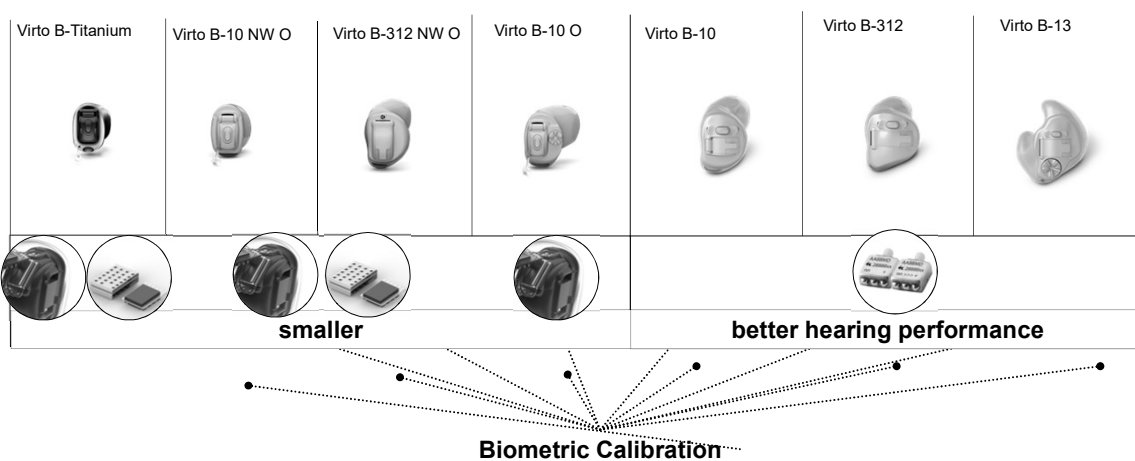
**No phase or magnitude  
mismatch** over time

**Accurate**  
and consistent

Reduction of  
**10 dB** input noise

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### Meet the new Virto B family

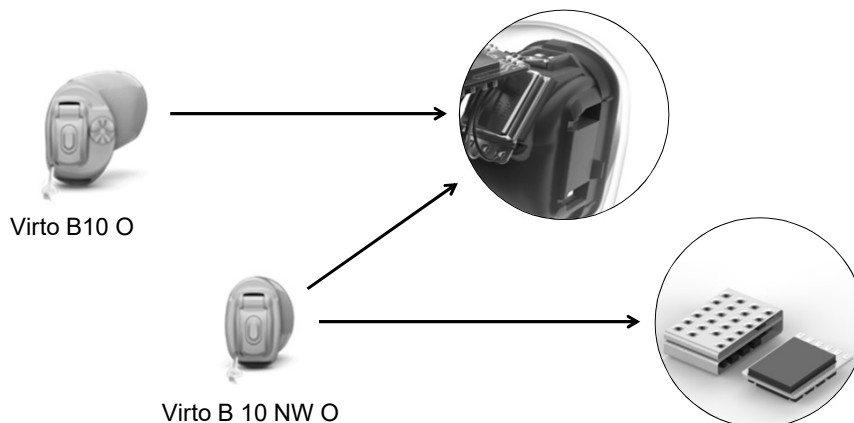


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## Small models get smaller

Thanks to leveraging **Virto B-Titanium** electronics




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## Additional tips and tricks



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### Phonak Virto B-Titanium Order Form

Step 1: Customer and Patient Information

Ship To Account: \_\_\_\_\_ Bill To Account: \_\_\_\_\_

Number: \_\_\_\_\_

Shaded field may increase device size

and (SD) - \$19.95 SP (602/118)

SP recipient \_\_\_\_\_

Open - focus occlusion reduction (OC) \_\_\_\_\_

Right \_\_\_\_\_

Left build (SY) \_\_\_\_\_

SP - shell style will be changed to CIC

\*All products are non-wireless

Internal use only: S, B, R, B2, L, L2, PM, B2, TMR, T2, GMR, PMP, BMT, TMO

33 | Fax 630-393-9858

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### Phonak Virto B-Titanium Order Form

Additional Information

Step 1: Customer and Patient Information

Please fill in the following sections:

- Account information
- Patient information
- Audiometric data (mandatory for ADV)
- Select left/right side
- Select warranty information

Step 2: Performance Level

Select performance level:

- B90 Premium
- B70 Advanced

Step 3: Product Options

Select the custom product options:

- Use the "smallest possible" track for fast ordering
- The shaded box options will increase device size
- All faceplates are black and shells are titanium

ADV = Acoustically Optimized Venting - Phonak will set the correct vent diameter and style in relation to Audiogram/Shell geometry/feedback canceler and required low frequency gain - this is the recommended vent type.


ADV-O = Acoustically Optimized Venting - Open. This specific venting is more open and recommended for first time users and clients who are sensitive to occlusion.

Cosmetic aspect:


Human ear canals are not fully symmetrical. Therefore binaural custom in-the-ear devices cannot always be built in the same size and position in the ear.

As an option, we can design the two devices to look similar in the ear. As a result, one device may not be as small as possible.


Please request this with the "symmetrical build (SY)" check box.




Shell styles



BIC



Without push button

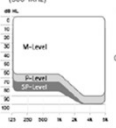


CIC

With Telecoil - device will be larger

Power level:

- Virto B-Titanium is designed for smallest device size
- Power level P/SP may increase device size
- ADV-O to be used for hearing loss up to 40dB in the low frequencies (500-8000)



Use EasyView Outlook

Impression beyond the 2nd bend

Concha details fully visible

Canal details fully represented

Tragus details fully visible

Recommendation for taking impressions:

- Use EasyView Outlook
- Always fill the complete concha with impression material

EasyView Outlook - A Phonak invention

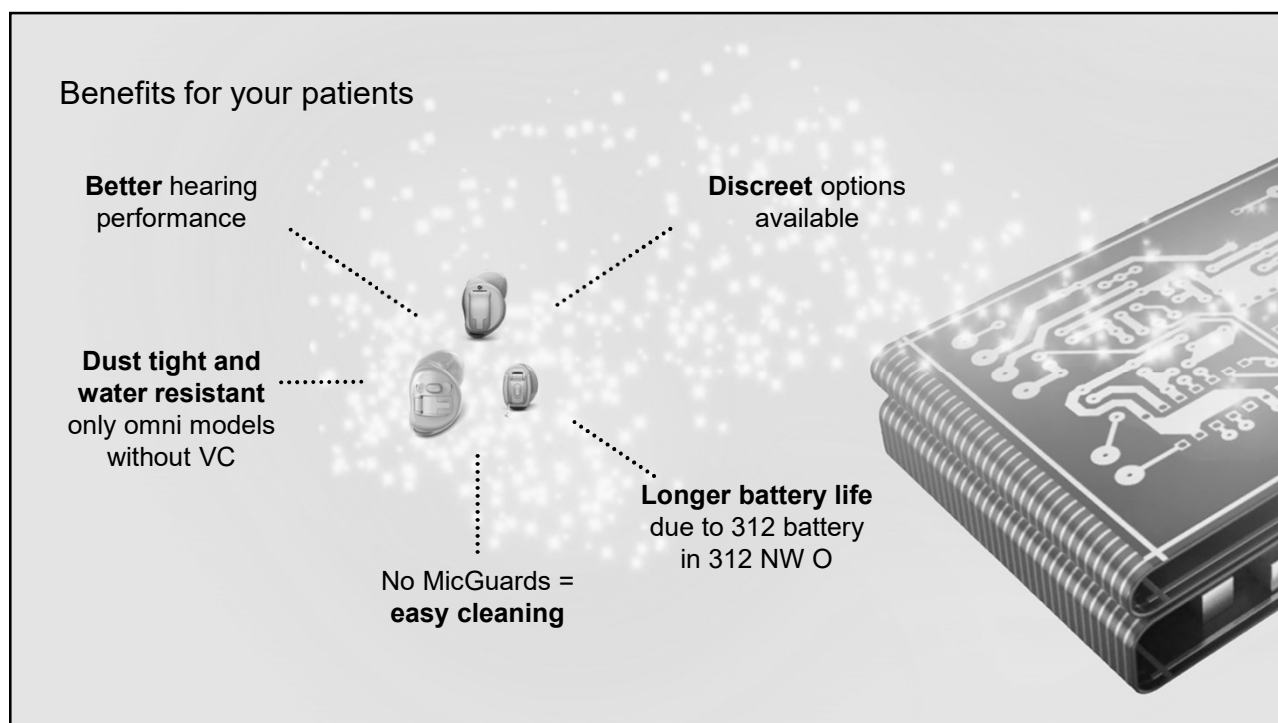
Size: SP 05A-0768 - 20pcs | MP 05A-0768 - 20pcs | LA 05A-0767 - 20pcs

## Benefits for you

- Better **directionality** "out of the box"
- No more **MicGuards**
- **Colored** battery door inlays
- **Same cables and wax protection** system at Venture
- **No changes** to the Target fitting process
- Potentially **less fine tuning** changes and higher first fit acceptance
- All Belong custom products have the push button option



Benefits for your patients



**Better** hearing performance

**Dust tight and water resistant** only omni models without VC

**Discreet** options available

**Longer battery life** due to 312 battery in 312 NW O

No MicGuards = easy cleaning



## AutoSense OS

Seamlessly adapt to any listening situation automatically and provide best sound quality.

### Patient benefit:

- Improved speech understanding by 20%
- No need to think about their hearing aid

### Provider benefit:

- More satisfied clients
- Less time creating and explaining manual programs

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## Research FINDINGS



20% better speech understanding thanks to the automatic selection of the best setting for everyday listening situations.



Better speech and sound performance in everyday listening situations compared to other automatic technology.



60% improvement in speech understanding by zooming in on a single voice in a noisy environment - versus without hearing aids.



37% reduction in effort when listening to conversations in cars compared to other automatic technologies



Calm 10% improvement in soft speech understanding with our newest products.



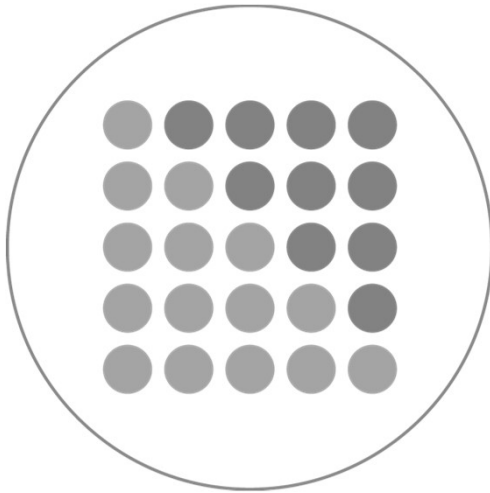
Most natural music experience. Top rated hearing aid for music sound quality.

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hearing aid users  
should not have to  
**think** about their  
hearing

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AutoSense OS is making life easier for the hearing aid wearer by dynamically choosing the settings that optimizes best speech understanding, comfort and sound quality in any listening environment.

Phonak market insight online survey 2014 US n192

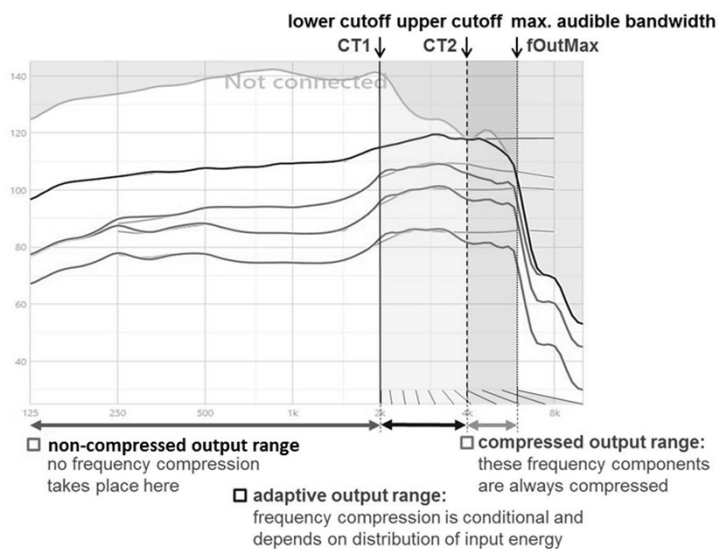
## SoundRecover 2

- **Maximize stimulation of the hearing nerve** by setting the Maximum Output Frequency at the upper limit of the individual's audible bandwidth.
- **Protect the mid and low frequencies** by setting **(CT2 or upper cut-off)** high enough so that audible speech (without compression) is not affected.
- If enough high frequency gain can be provided to make high frequency speech sound audible then **frequency compression is often not needed for mild hearing losses.**



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## SoundRecover2 - intelligent adaptive frequency lowering algorithm



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## SoundRecover2 on or off?

Steps used to determine the SoundRecover 2 on/off default

Step	Audiogram dB	Default
1	Normal high frequency hearing (8kHz HL ≤ 25 dB)	OFF
2	Reverse slope. (HL at 8kHz is ≥ 30dB better than at 3kHz)	OFF
3	Reverse slope but poor high frequency hearing (HL at 8kHz ≥ 45dBHL)	ON
4	None of the above (calculation based on HL at 3kHz to 8kHz)	ON/OFF

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## SoundRecover2 summary

Restores access to high-frequency information, preserving high-frequency discrimination and sound quality.

Utilizes an adaptive algorithm, maintaining the familiarity of low- and mid-frequency sounds.

Extends benefits to those with more severe and profound hearing losses, using a lower cut-off frequency and weaker compression.



### SoundRecover2 – the first adaptive frequency compression algorithm

More audibility of high frequency sounds

Phonak led the way in modern frequency lowering technology with the introduction of SoundRecover in 2008. Since then, extensive worldwide field studies with adults and children have found increased direction, discrimination and recognition of high frequency sounds, better speech understanding and significant improvement in interaction and overall voice quality for users. For those with more extreme severe-to-profound losses, however, including off-center audiograms and air-edge losses, the benefits have been limited due to the restricted audible bandwidth in which frequency compression could be applied. The new SoundRecover2 algorithm aims to extend the audibility of relevant high frequency sounds which hearing intact the low frequency structures important for good sound quality. The new frequency lowering scheme closely mimics the manner of the original SoundRecover, utilizes an adaptive algorithm and an adjustable cut-off frequency in order to successfully extend these benefits to those with more extreme severe-to-profound hearing loss.

#### Introduction

The reassigning of frequencies for extending the perceptual audible bandwidth of hearing aid users has been commercially available for approximately 10 years now. Phonak introduced SoundRecover, non-linear frequency compression, with the first Nucleus in 2008, offering a solution for restoring audibility of conventionally unavailable high frequency sounds.

In order to achieve distortion-free amplification of the input signal, SoundRecover exploits the fact that sounds are dominated by greater energy in the low frequencies whereas sensitive structures are dominated by greater energy in the high frequencies. For this reason, SoundRecover was designed with a cut-off frequency which is the starting point of compression. For inputs below the cut-off frequency, the input signal is not subject to frequency compression. All inputs above the cut-off frequency are subject to frequency compression. Hence, the output area below the cut-off frequency is unchanged, while the output area between the cut-off frequency and the upper edge frequency is compressed with a constant compression ratio. The upper edge frequency corresponds to the maximum output frequency and is set according to the audible bandwidth of the individual audiology. The cut-off frequency is

limited to a minimum value of 1.5 kHz. This means that important sound structures are left unchanged, and at the same time allows presentation of the noise-like high frequency components of speech in the individual audible range. A more detailed discussion of the SoundRecover frequency lowering system is provided in the paper by McDermott (2015).

Experience has shown that the SoundRecover frequency lowering scheme works very well for speech and for high frequency sounds such as bird song or environmental sounds. It can be successfully applied to hearing losses where audible hearing is available above 1.5 kHz allowing the high frequency to be compressed into an audible region. However, the fitting of more extreme severe-to-profound losses, like off-center audiograms and air-edge audiograms, where users have only low frequency hearing thresholds, has presented unique challenges. These losses require more aggressive parameter settings (lower cut-off, stronger compression) which then those available with SoundRecover due to concerns about impact on sound quality.

In order to widen the reach of SoundRecover, the new SoundRecover2 algorithm is designed to allow operation with lower cut-off frequencies and weaker compression ratios, thereby extending the benefits of frequency compression to a broader audience of children and adults.

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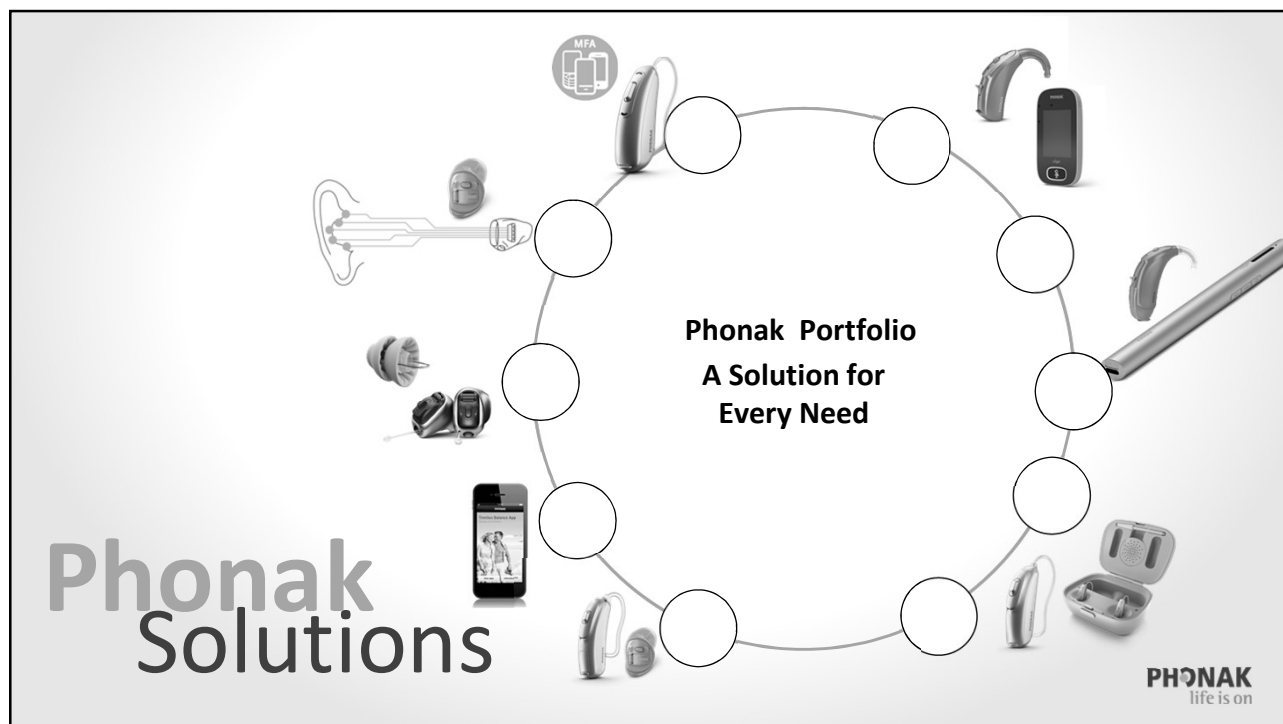
## Target 5.2: What's new?



1. New products available
2. No new cables
3. Convenient online software update via the [Updates] tab

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The image is a circular diagram representing the Phonak portfolio. A central circle contains the text "Phonak Portfolio" and "A Solution for Every Need". Surrounding this central circle are 12 smaller circles, each connected to the center by a line. Each of these 12 circles contains a different Phonak product, including various styles of hearing aids (behind-the-ear, in-the-ear, and cochlear implants), a mobile phone, a small electronic device, and a hearing aid case. The text "Phonak Solutions" is written in a large, bold font on the left side of the diagram. The Phonak logo, consisting of the word "PHONAK" in a bold, sans-serif font and the tagline "life is on" in a smaller font below it, is located in the bottom right corner of the diagram.

**Phonak**  
**Solutions**

**Phonak Portfolio**  
**A Solution for Every Need**

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**Together, we change  
lives**