

# Phonak Insight

August 2015

## Phonak Venture Custom Products

### The secret to a smaller size

The miniaturization continues. With Virto Venture, Phonak introduces a combination of a new, modern looking faceplate design and the usage of new technologies. Developments like the Floating Antenna™, the shielded hybrid chip and the possibility to switch to a size 10 battery for directional custom hearing aids reduces the size of our full featured and wireless hearing aids. In numbers these improvements leads to an average reduction of 25% in faceplate size, deeper insertion by ca. 1.5 mm and smaller shell volume of 13% by average for the Virto V-10. This is compared to the previous generation of smallest custom product of the previous generation with Binaural VoiceStream Technology™, the Virto Q-312.

#### Introduction

It is well known that one of the biggest reasons for choosing custom products is their small size and discreetness. Therefore a main goal in the development of the new Virto generation was to minimize the size of the instruments without any compromise on performance. This aspiration led us to build our smallest and most discreet, full featured product with in average 25% smaller than the previous generation, while incorporating all of the performance advantages of the Venture platform: The Phonak Virto V-10. Figure 1 shows a comparison of the smallest full featured Virto Q (Q-312) and the smallest full featured Virto V (V-10) taken during validation studies at the Phonak Research Center.



Figure 1: Smallest full featured Virto V (left) and the smallest full featured Virto Q (right)

#### How to get smaller

Let's have a look into the details. Four main parameters are responsible for the size reduction in the Virto V-10 compared to the previous Quest platform.

- Floating Antenna™
- Size 10 battery
- Shielded HI hybrid chip
- AOV<sup>1</sup>

<sup>1</sup> AOV (Acoustically Optimized Venting) is available since 2007. It is still a factor for creating smaller devices which are dependent on the individual size and style of the vent

#### The Floating Antenna™

The Floating Antenna™ is the key to how the Virto V-10 can be made so small, yet still has the ability to take full advantage of Binaural VoiceStream Technology™. The antenna is no longer fixed to the faceplate and can therefore be individually placed in the optimal position inside the shell. This leads to an enhanced insertion depth and results in a significant reduction of the visible surface area of the faceplate.

#### Using a size 10 battery

The new chip has an optimized power management. Lower current peaks allow the usage of a size 10 battery in a directional

wireless hearing aid. On average, two more days of battery life can be achieved, compared to the previous generation. This leads to two major benefits:

- Using a size 10 battery contributes to a smaller sized faceplate and a more discreet custom hearing aid
- The Virto V-10 uses Binaural VoiceStream Technology™ to take advantage of key binaural features such as StereoZoom and DuoPhone

### The shielded HI hybrid chip

The state-of-the-art HI hybrid in Phonak Venture hearing aids is shielded. This has a huge benefit for Custom Products. Shielding means that the electronics are less sensitive to electromagnetic influences from transducers and coils. There are also fewer restrictions on where internal components can be placed in the Custom Product shell. This flexibility leads to a smaller shell size, resulting in less visibility in the ear.

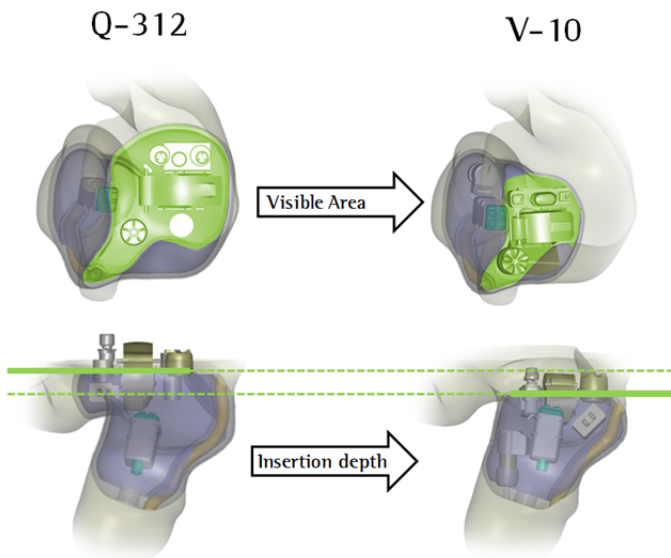


Figure 2: The Floating Antenna™, the shielded hybrid and the possibility to switch to a size 10 battery for directional custom hearing, equates to a 25% reduction in faceplate size for the Virto V-10. This is compared to the previous generation of smallest custom products with Binaural VoiceStream Technology™, the Virto Q-312, and based on the data from 60 standard ear impressions.

### AOV – The Individual vent

In addition the Phonak Virto V-10 can be made smaller by using the Phonak developed venting approach AOV (Acoustically Optimized Venting), developed and continuously improved by Phonak since 2007. AOV calculates the optimal individualized vent based on the client's audiogram, shell size and the chosen HI-technology. It designs the individually optimized vent with regard to:

- Occlusion effect reduction
- Feedback risk for required gain
- Advantage of direct sound
- Required low frequency gain

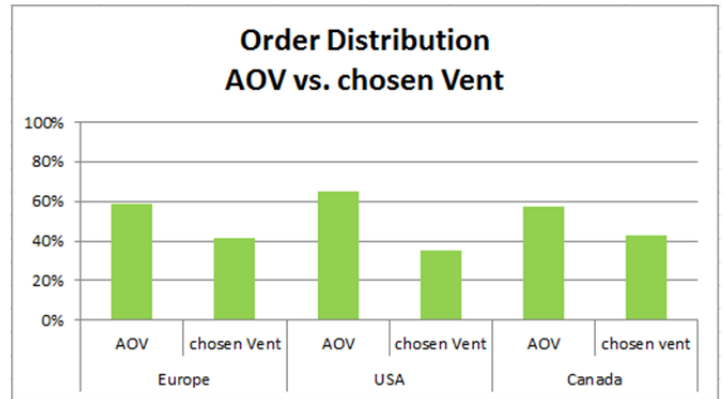


Figure 3: Distribution of ordered vents (AOV vs. chosen vent)

Every vent has an acoustic mass.

The acoustic mass describes the effect of the vent. The amount of sound which escapes through the vent depends on the acoustic mass of the vent and not solely on the diameter of the vent. The acoustic mass is proportional to the length of the vent and inversely proportional to the cross-section area of the vent. Hence, the same acoustic mass could be reached with completely different dimensions. A small sectional area of a short vent is equivalent to a big sectional area of a long vent. A big acoustic mass stands for a small or long vent and vice versa.

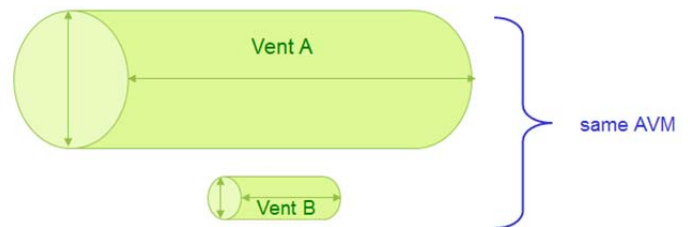


Figure 4: Acoustic Vent Mass (AVM) demonstration

The Phonak digital manufacturing software provides the possibility to realize different shaped vents besides the round standard vent. This strength is a huge advantage in terms of space optimization and comfort for the custom made shell. To make it easy for the hearing care professional, all they have to do is select AOV when ordering a Custom hearing aid. When the Custom Product is connected to the Phonak Target fitting software, the acoustic mass is automatically read and AOV is set as the default vent. AOV is used as the basis for the pre-calculation, ensuring that the right curves of RECD, vent loss (the sound leaking out of the residual volume) and the estimated feedback threshold are used.

## The perception of the individual

The Virto V has been measured and compared to its predecessors and is capable of offering more hearing performance in a smaller size. This is important as the size-perception of the wearer is very important.

Subjective feedback collected at the Phonak Research Center confirms improvement of the Phonak Virto V-10 in size and design. Subjects were asked to rate the size and design of Virto Venture compared to Virto Quest. 60% of the subjects rated the size of Virto V-10 in a direct comparison to Q-312 as "Very Small" or "Small". 80% of the subjects rated the design of Virto V-10 in direct comparison to Q-312 as "Very Appealing" or "Appealing".

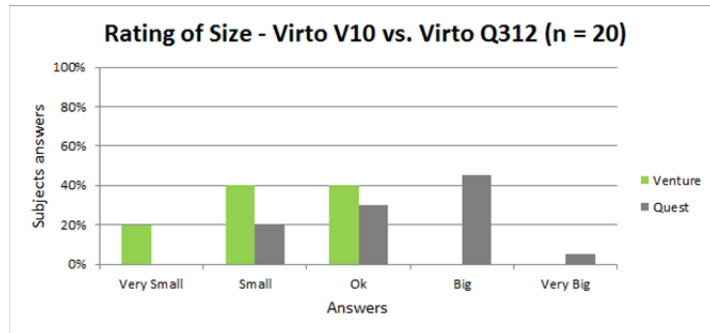


Figure 5: Rating of the size of Virto V-10 vs. Virto Q-312 via direct comparison in lab

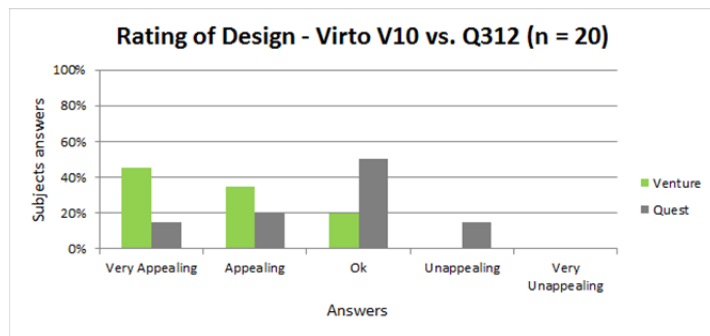


Figure 6: Rating of the design of Virto V-10 vs. Virto Q-312 via direct comparison in lab.

## Summary

Thanks to the innovative combination of design and technology, Phonak Virto V-10 is the smallest full featured, fully operational, directional wireless Phonak hearing aid available in the market. It is appealing to clients who are seeking a discreet hearing aid while being able to help them hear better in even the most challenging listening situations.

Virto V-10 compared the previous generation of smallest custom products with Binaural VoiceStream Technology™, Virto Q-312, shows the following improvements:

- Has a deeper insertion by ca. 1.5 mm
- Shell volume is smaller by average 13%
- Visible faceplate area reduced by average 25%

## References

1. Phonak Research Center, Fit rate Study Collection, Comparison V Q 312 10 dir., June 2015
2. Phonak Research Center, system validation measurements, July 2015
3. Audioinfos, The acoustically optimized vent – a new ITE feeling, Audioinfos No. 89, T. Pötzl, August 2009