

OTICON | Sensei SP

# Power your senses



Oticon  
BrainHearing™  
Technology

**Speech Rescue™ and  
Speech Guard E**  
More speech details  
than ever before



**oticon**  
PEOPLE FIRST



# Power your Senses

For children with hearing loss, sound processing is fundamental to developing effective communication skills, as it affects their ability to hear, speak and read.

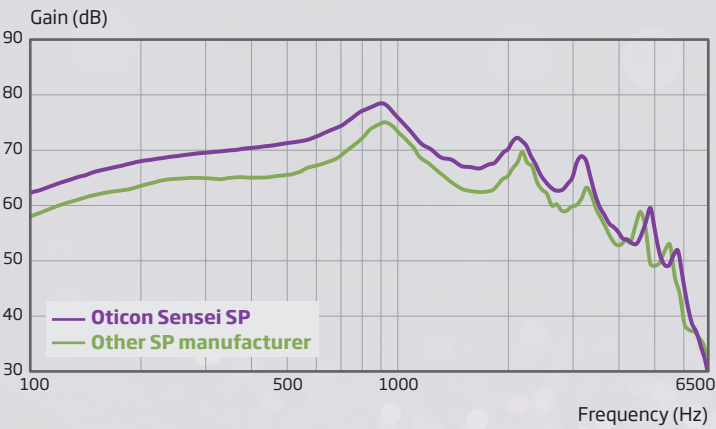
Oticon Sensei Super Power’s BrainHearing™ technology ensures that young brains are stimulated to learn. Learning means that the brain is changing and becoming better organized, which is important because it allows the child’s brain to optimize sound input and get the most out of speech.

At Oticon, our pediatric mission is very specific: to create a better future for every child with hearing loss. Children with severe to profound hearing loss are no exception.

**Sensei Super Power** features a new unique approach, which allows Oticon’s innovative frequency composition, Speech Rescue™, to work in combination with Speech Guard E to preserve vital speech cues. First, Speech Rescue performs precise frequency composition by lowering high frequencies to ensure full access to inaudible sounds. Then, Speech Guard E’s superior adaptive compression preserves the important speech details.

This “Rescue” and “Guard” approach is designed with one goal in mind: **to increase speech understanding.**

**Leading the Super Power category  
with Oticon BrainHearing™ technology**



Full-On Gain measurements performed in technical settings according to IEC-60118 (2 cc coupler). Oticon Sensei SP (purple) and other manufacturer (green). Both super power devices are size 13 battery.

**139dB SPL/78 dB**  
Highest output ever from a BTE13

**Speech Rescue™**  
Innovative access to the inaudible frequencies

**Speech Rescue™ and Speech Guard E**  
More speech details than ever before

**Inium Sense feedback shield<sup>SP</sup>**  
Effective feedback control

**LED, IP58 and hypoallergenic**  
Meeting highest safety and reliability standards

**Bimodal fitting protocol**  
Fitting flow for bimodal balance





# Rescuing the missing sounds of speech

Missing high frequency sounds such as “s” or “th” can negatively impact speech development. Sensei Super Power’s new precise frequency composition, Speech Rescue™ increases speech understanding by rescuing speech cues that would otherwise be lost.

NEW

**Why compress, when you can use the naturally vacant spaces in speech?**

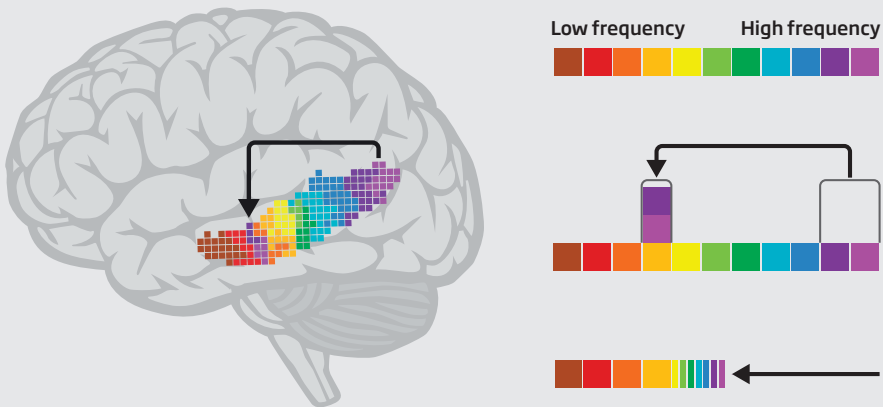
Speech Rescue takes advantage of the opportunities offered by the dynamics in speech. Speech is dominated by mid frequency energy, but some sounds are high frequency. When these high frequency sounds occur, usually no mid frequency sound is present at the same time. Instead of compressing sounds, Speech Rescue precisely positions the high frequency energy in the available space without disturbing the mid frequencies.

**Why cut, when you can copy and keep?**

Rather than leaving the high frequency auditory pathway completely without stimulation, the Speech Rescue algorithm selects the relevant high frequency sounds where the inaudible speech cues are located. It then copies them and adds them at the frequency range that the child can hear. During this process, the high frequency sounds remain untouched in their natural location to keep a natural broad frequency response available to the child across all frequencies at all times.\* Speech Rescue increases speech understanding by rescuing cues that would otherwise be lost.\*\*

**New insights into frequency lowering has led Oticon to develop an innovative approach**

Sounds of different frequencies activate different regions in the brain in an organized manner. Through Speech Rescue technology, high frequency sounds (shown in purple) are moved to lower frequency regions, which allows the brain to respond to the copied sounds (shown in purple) in a different area.



The natural signal

**Oticon's innovative frequency composition**  
Oticon's precise approach to frequency composition **KEEPS** the high frequencies and **COPIES** them to the mid frequency regions.

**Traditional frequency lowering strategy**  
Some hearing solutions press sound together along the frequency axis, compiling a lot of information into a small area, while leaving the high frequency region unstimulated.

**What this means for the child**

- Gives the child the audibility to hear more speech sounds
- Hearing high frequency sounds, such as “s” and “th”, helps increase speech understanding

\* The Speech Rescue fitting panel in Oticon's Genie software gives you the choice of preserving the complete bandwidth of the device, even when frequency composition is ON, or alternatively turning OFF the high frequency sounds completely.  
\*\* Frequency lowering should only be purposely introduced in the amplification strategy when conventional amplification cannot fully restore access to high frequencies. Reference: AAA, Pediatric Amplification Guidelines, 2013.



# More speech details than ever before

Sensei Super Power offers the most speech details in sounds by using Speech Rescue™ together with Speech Guard E to rescue sound and guard it.

**NEW**

**Unique “Rescue” and “Guard” approach:  
More speech understanding**

Speech Rescue™ works in combination with Speech Guard E to preserve vital speech cues. First, Speech Rescue precisely copies and adds the high frequency sounds to a lower audible frequency region. Then, Speech Guard E brings the softest sounds into the narrow listening range, while preserving the important speech details. This approach effectively captures, copies, adds and amplifies the input signal to provide the child with vital speech cues.

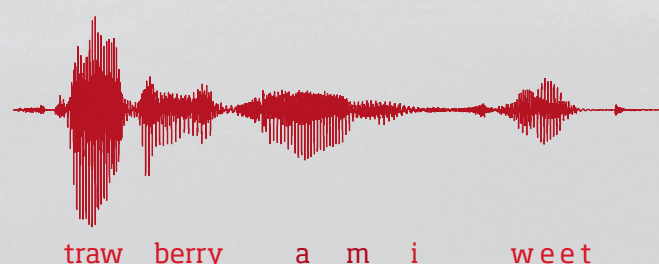
The “Rescue” and “Guard” approach ensures that many of the lowered speech cues are preserved during compression of the signal, as it is done with as little squeezing, distortion and smearing as possible. It offers the child the opportunity to capture nuances of speech that can increase speech understanding in complex listening environments.

**Speech Guard E is the preferred compression strategy**

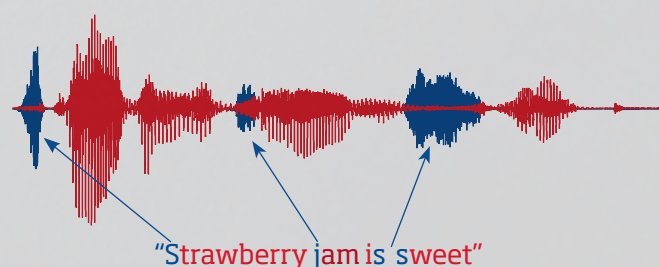
Speech Guard E is the amplitude compression system in Oticon Sensei SP Pro. It combines two methods of amplification - non-linear and linear - in a single compression system that helps preserve the fine details of sound from soft to loud, making sounds audible, comfortable and clear.\*

The child will get all the audibility that they need and will experience the sound information they need to improve speech understanding. Most importantly, Speech Guard E delivers high-quality sound by preserving the differences in intensity and nuances of the speech signal to support the child’s brain in making sense of sound. This is vital with a hearing loss of such magnitude, because every single speech cue counts.

**High frequency sounds missing = insufficient information**



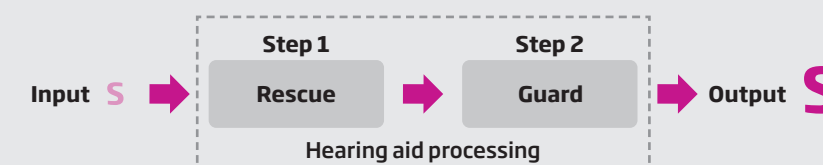
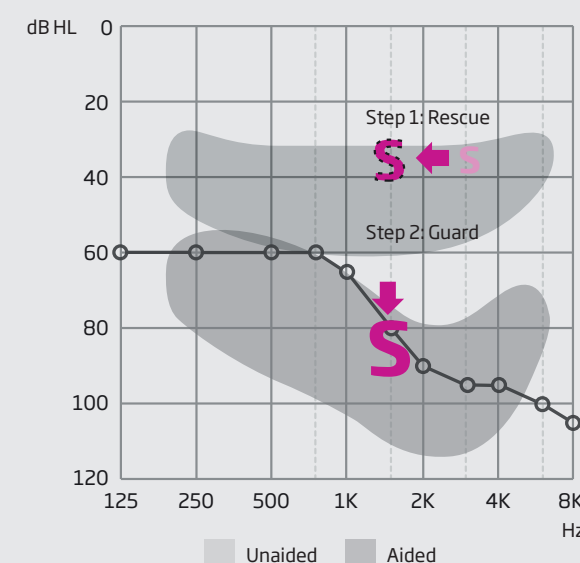
**High frequency sounds made audible = a more complete speech signal**



## What this means for the child

- Gives the child more speech details than ever before
- Helps the child perceive speech more clearly to support language development
- Supports the child’s brain in making sense of speech sounds to improve speech understanding

## Every speech cue counts



### Step 1 “Rescue”:

In the signal path of the hearing aid, high frequency components of the incoming sounds are first moved to lower frequencies through Speech Rescue.

### Step 2 “Guard”:

The high frequency sounds are then amplified with Speech Guard E. This compression system guards the dynamic contrast of the entire signal to let the rescued speech sounds appear clear.

\*Pittman et al. 2014 “Effects of Fast, Slow and Adaptive Amplitude Compression on Children’s and Adult’s Perception of Acoustic Information”, Journal of American Academy of Audiology (JAAA), Vol. 25, No. 9, 2014.



# Full access to sound New effective feedback control

Sensei Super Power effectively controls feedback while providing children with powerful amplification and continual access to speech and high quality-sound.

As an audiologist working with children with severe to profound hearing loss, you play an important role in establishing sufficient audibility and ensuring that every decibel prescribed is according to clinically validated fitting rationales.

**NEW**

## Inium Sense feedback shield<sup>SP</sup>

The Inium Sense platform and its new ultra-fast processor deliver a highly efficient feedback management system that has been specifically adapted to super power output levels. We call it Inium Sense feedback shield<sup>SP</sup>. This system is capable of **detecting** the risk of feedback much faster, **preventing** it more effectively and **eliminating** it more efficiently if it is about to occur.

The anti-feedback system in Sensei SP is specifically designed for severe to profound hearing losses. It ensures

feedback is managed at low frequencies without compromising sound quality. This is done by only using the frequency shift when necessary. In this way, feedback is always managed effectively across an extended frequency region, while still keeping the carefully preserved speech details.

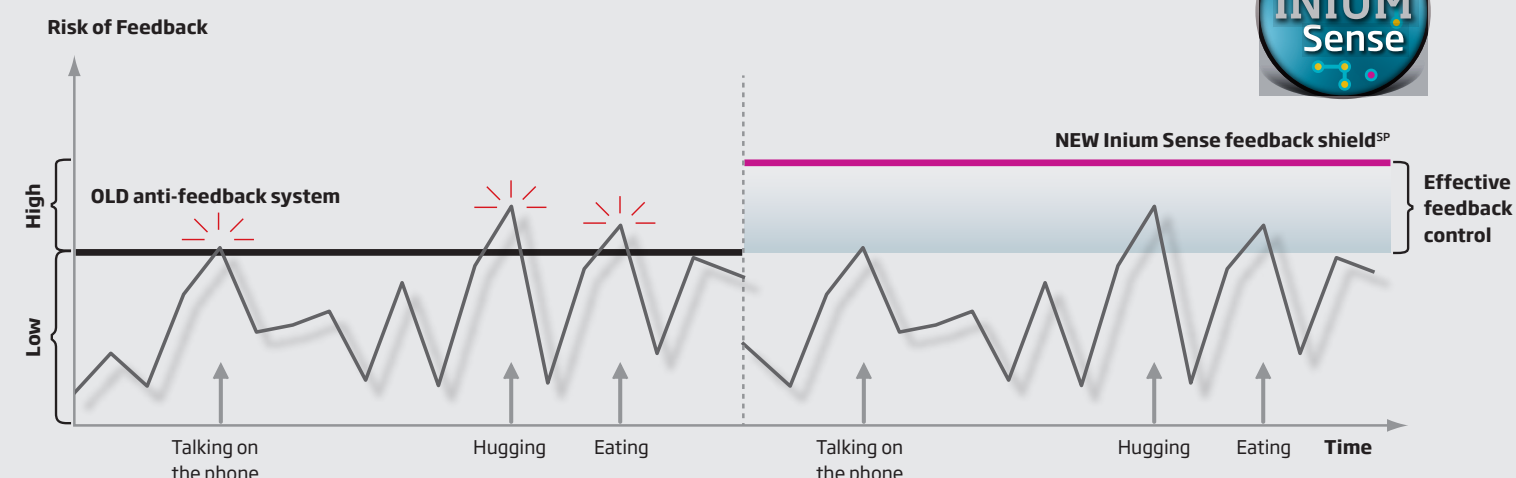
## Triple feedback protection

Inium Sense feedback shield<sup>SP</sup> draws on three technologies to manage whistling and system instability close to the feedback limit: phase Inversion, frequency shift and gain control. These are carefully applied based on both feedback detection and detection of speech. This method leaves the child with high sound quality, while also enabling the targeted gain prescription.

### What this means for the child

- Give hugs without annoying whistling
- Prevents feedback while preserving high sound quality
- Wear comfortably during the day

## Effective feedback control



*Inium Sense feedback shield<sup>SP</sup> lifts Sensei SP out of the feedback risk area by effective feedback control. When critical acoustic events occur as part of a typical day, effective feedback control ensures continuously high sound quality by eliminating feedback efficiently.*



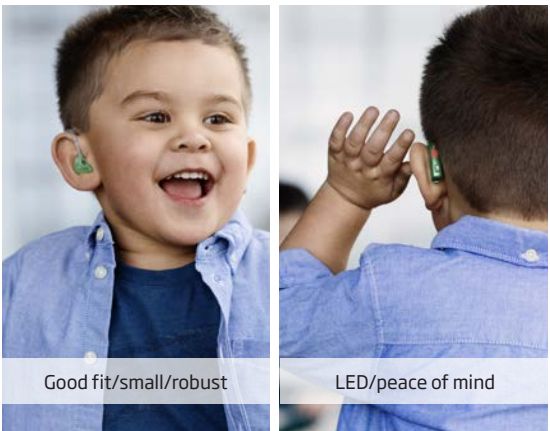
# Secure and reliable for children of all ages



Oticon pediatric hearing aids meet the highest safety and reliability standards. Sensei Super Power is safe, fits securely on the ear and is capable of withstanding humidity, water, dust and heat. It is also hypoallergenic!

**Robust, reliable and durable. Designed to last**  
To ensure its high quality, Sensei SP, like all Sensei hearing aids, has undergone extensive internal tests and meets strict internal durability requirements and international child safety standards (IEC 60601-2-66:2012).

**Safety first, in all aspects of the child's life**  
Child safety has always been a prime concern at Oticon. To keep inquisitive fingers away, Sensei SP's battery door and instrument button can be made tamper-resistant for the youngest users to prevent accidental swallowing of the batteries.



Good fit/small/robust

LED/peace of mind



Robust design with secure access pins and durable hook.

## What this means for the child

- **LED status indicator** gives peace of mind to parents and caregivers
- **IP58 classified** for dust- and water-resistance with nano coatings to protect the hearing aid
- **Drop-resistant** to withstand children's rough treatment
- **Hypoallergenic**, including the accompanying decorative stickers, and with biocompatible painted surface to protect against allergies
- **Phthalate-free.\*** In fact we have excluded more than 200 potentially harmful materials, substances and compounds to minimize allergies
- **Tamper-resistant battery door** as standard for ages 0-3 to avoid accidental swallowing of batteries

\* Phthalates may affect the hormone system according to the National Institute of Environmental Health Sciences, USA.





# Confidence in bimodal fittings



Oticon Sensei Super Power is the perfect choice of hearing aid for bimodal fittings. In Oticon's fitting software Genie, a short and simple flowchart guides you through the steps to program Sensei Super Power to work with any brand of cochlear implant.

NEW

## Developed by experts at Boys Town National Research Hospital

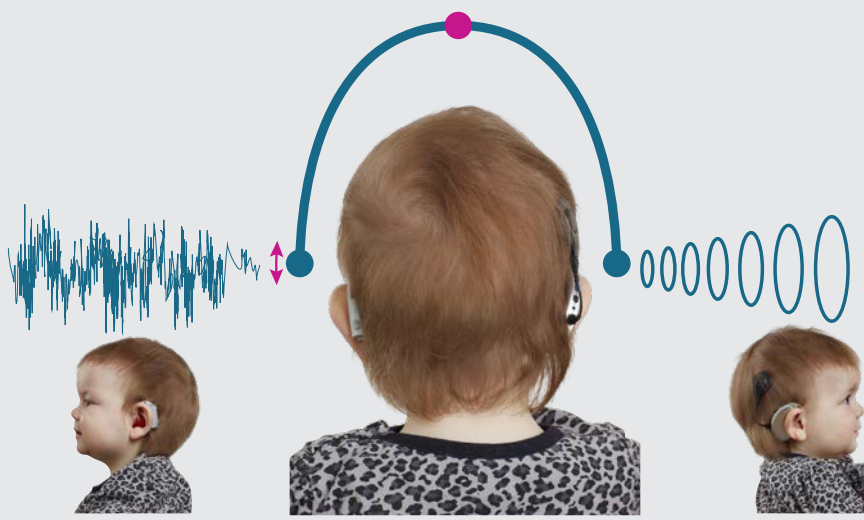
To bring bimodal benefits to all children using Sensei SP, Oticon has implemented a bimodal fitting guide in the Genie fitting software. Developed by experts at the Boys Town National Research Hospital, the bimodal protocol in the Genie fitting software combines the very latest research with a practical clinical approach. With a few simple steps, the flowchart guides you in balancing loudness and shaping the frequency response.

## Fitting flow for bimodal balance

The purpose is to provide the child with the best possible acoustic settings and to balance these with cochlear implant mapping when fitting an implanted child with a Sensei SP hearing aid. Bimodal fitting is important because stimulation early in life with both acoustic and electric sound can potentially benefit children in their musical, speech and language development and potentially affect the child's future academic success.\*

## Sensei SP is the perfect choice of hearing aid for bimodal fittings

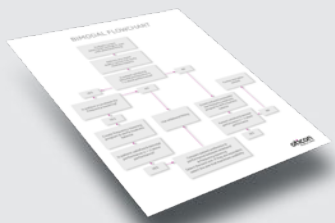
It is most likely not a case of *if* you will be asked to manage a unilaterally implanted child, but *when*.



Oticon Sensei SP

In a bimodal fitting, one ear is stimulated acoustically and the other is stimulated electrically.

A cochlear implant



The bimodal fitting protocol takes into account the following fitting approaches: wideband fitting, restricted bandwidth fitting, use of frequency lowering and loudness balancing.

\* Nittrouer & Chapman (2009) "The effects of bilateral electric and bimodal electric-acoustic stimulation on language development", Trends Amplif. Sep;13(3).

# Enhanced fitting capabilities for child-specific needs

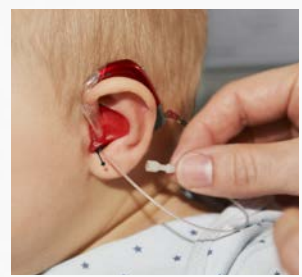


## EasyRECD™

### The fast and easy way to include ear acoustics

Oticon's EasyRECD™ tool is an accurate, easy-to-use and time-efficient tool that helps you include real-ear-to-coupler difference (RECD) when fitting Sensei SP.

Taking just five minutes per ear, it can easily be adapted into daily practice. The EasyRECD tool was developed and validated in collaboration with experts Sheila Moodie, Ph.D. and Shane Moodie, MCISc from Western University, Ontario, Canada\*.



Oticon's EasyRECD tool is an accurate, easy and time-efficient way to get the RECD included in the fitting.



## VoicePriority™

### VoicePriority*i* adjusts the FM signal at ear-level

When an FM receiver is enabled, VoicePriority*i* monitors the noise level around the child. If noise levels reach 58 dB(A) and the teacher is talking, VoicePriority*i* incrementally increases the FM gain. This ensures that each child's FM gain is adjusted to their individual needs. Researcher Erin Schafer, Ph.D. University of North Texas, USA has validated VoicePriority*i* in favour of a traditional FM or a hearing aid alone\*\*.



## FM compatible

### Dedicated FM options for school

To support each child's educational performance, we offer the Oticon Amigo family of FM devices. Amigo adheres to FM fitting guidelines, and the increased signal-to-noise ratio gives children an improved opportunity to listen and learn in class. Amigo R12 is Sensei SP's dedicated FM receiver. Sensei SP is also compatible with wireless systems from other manufacturers, which can be directly attached through the Amigo FM9 shoe.



## ConnectLine

### Easy connectivity for greater participation

With ConnectLine and Streamer Pro, children can get their favourite music, phone calls and audio from the TV streamed into their hearing aids. They can also control it via iPhone®, iPad®, iPod touch® and Android™ devices with our free ConnectLine App.



For more information and details on compatibility, please visit [www.oticon.ca/app](http://www.oticon.ca/app)

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\* Moodie KS; Moodie STF, Easwar V & Oticon Pediatric, Pilot validity study, Whitepaper 2014

\*\* Schafer et al. 2013 - "Effects of VoicePriority in FM Systems for Children with Hearing Aids", Journal of Educational Audiology 19:12-24, 2013.





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