

M&RIE receiver:

Reducing wind noise, naturally

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Wind creates turbulence over the exposed microphones of hearing aids, producing a disruptive noise for the hearing aid user. While wind noise reduction (WNR) algorithms are effective, they can simultaneously decrease audibility of speech and negatively impact sound quality.¹ The unique Beltone Microphone & Receiver-In-Ear (M&RIE) offers built-in protection from wind, due to the placement of the third microphone inside the ear canal. Previous measurements have shown up to 15 dB of natural reduction in wind noise due to the in-ear placement of the M&RIE receiver.² A new study further investigated M&RIE advantages in wind noise.³

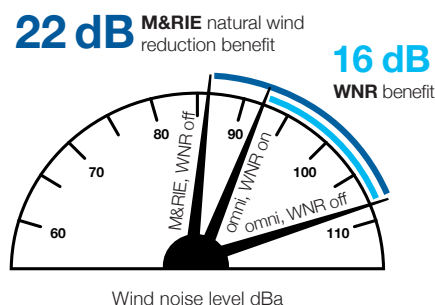
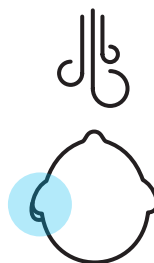
M&RIE reduces wind noise best, from any direction...

Wind noise varies in intensity based on the orientation of the hearing aid microphones relative to the direction of the wind, as does the benefit from wind noise reduction. The current study was able to capture this by measuring hearing aid output fitted onto a head and torso simulator (HATS) in a wind tunnel at various azimuths. The following figures show results recorded from the left hearing aid in omnidirectional mode with WNR on and off and M&RIE, using a wind speed of 8 meters per second (m/s).

0° – Wind is head-on

Wind noise is loudest and WNR is very effective.

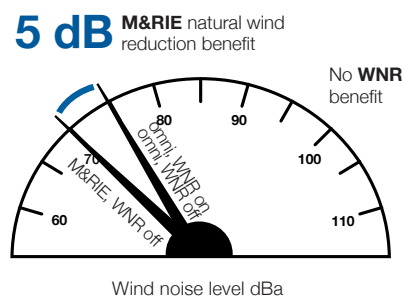
M&RIE reduces wind noise best, with 22 dB of total reduction.



90° – Wind blowing against right side of head

Wind is less intense from this angle, with the left hearing aid protected from wind by the head.

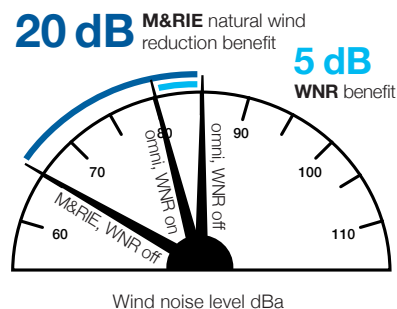
WNR has no effect at this angle, while M&RIE reduces wind noise by 5 dB.



270° – Wind blowing against left side of head

Wind is louder from this angle, and WNR reduces wind by only 5 dB.

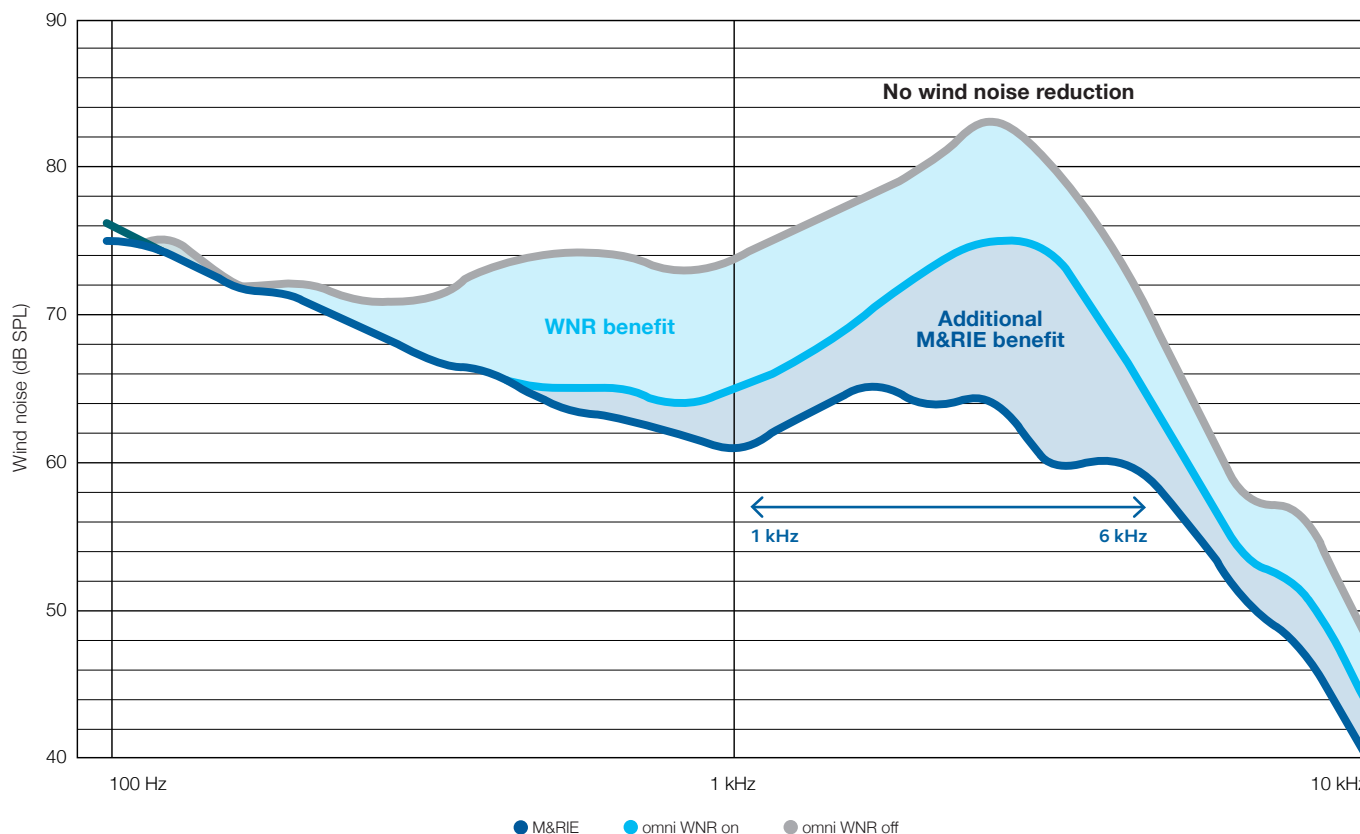
M&RIE offers 20 dB of natural wind noise reduction.



... and across the frequencies that matter most for speech

The same measurements from above were analysed in the frequency domain, resulting in the following figure of hearing aid output (in dB SPL) as a function of frequency. Recall the measurements were made from the left hearing aid in omnidirectional mode with WNR on and off and M&RIE, using a wind speed of 8 meters per second (m/s).

WNR and M&RIE both reduced wind noise up to 10 dB in the low frequencies. But from 1 kHz to 6 kHz, M&RIE offered an additional 4-14 dB of wind noise reduction – all without any decrease in gain. This is especially valuable considering the importance of maintaining audibility for mid- and high-frequency sounds to support speech understanding.



Hearing aid users report a better listening experience in wind with M&RIE

Does the wind noise advantage measured with M&RIE in a wind tunnel translate into perceptual real-world benefit? **Yes!**

Seventeen experienced hearing aid users were binaurally fitted with Beltone Imagine RIEs and wore them in their daily life. Whenever they experienced a windy situation while wearing the hearing aids, they answered questions in real time about their hearing abilities and satisfaction. They answered the same set of questions while trying two programs – Crosslink

Directionality III (CLDIII) and M&RIE – to capture the effectiveness of M&RIE in wind.

The mean rating for enjoyment of sound was significantly higher when the participants used M&RIE compared to CLDIII. The study participants with more severe hearing thresholds (4PTA > 60 dB HL) reported additional benefit from M&RIE in wind, including better speech understanding and greater overall listening satisfaction.

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