
GET YOUR PRACTICE & PATIENTS IN THE LOOP

*Telecoil and Hearing Loop
Essentials for Practitioners*

By Juliëtte P. M. Sterkens, Au.D.

Close to ten years ago, David Myers, Ph.D., a social psychologist from Hope College and a hearing aid user, experienced a hearing loop while attending a service at Iona Abbey in Scotland. This experience was so transforming, that upon returning to the U.S. he launched, with community support, an initiative to introduce hearing loops to Holland, MI. Now, almost a decade later, hundreds of hearing loops can be found in places of worship, senior centers, meeting rooms and conference centers in western Michigan.



It was late 2008 when I heard Dr. Myers speak at a Wisconsin HLAA meeting. This lecture proved career transforming to me. As an audiologist in private practice for nearly 3 decades, I have worked to give my clients the best hearing possible, though understanding in reverberant and large meeting places continued to be an elusive goal. Suggestions that my patients use FM or infra-red assistive devices were rarely acted on.

Listening that fateful day to Dr. Myers' story, I realized why most hearing aid users are so reluctant to seek help and that I could perhaps bring hearing loops to my community with the help of my retired engineer husband.

My initial local hearing loop promotion has now evolved into state and nationwide loop advocacy work and a desire to educate audiologists about the benefits of hearing loops to our patients as well as our audiology practices. The purpose of this article is to give the busy practitioner an overview of hearing loops, telecoil variables, and how a mutually beneficial relationship with an audio professional/hearing loop installer might be established.

The IEC Hearing Loop Standard 60118-4

Induction loop systems used in Europe and many other countries are required to meet the established international standard IEC 60118-4 as developed under the auspices of the IEC (International Electrotechnical Commission). This IEC standard defines the strength of the magnetic field, frequency response, and methods of measuring these requirements. It also specifies the maximum levels for electromagnetic background noise. For more information on this standard see www.efhoh.org/documents_presentations/.

Currently there is no regulatory organization in the U.S. that has set a hearing loop standard. Therefore it made sense for U.S. hearing loop manufacturers and hearing loop vendors of European equipment to adopt the European IEC standard for hearing loops. Compliance with this standard allows the same hearing aid user to worship at Iona Abbey in Scotland, attend a basketball game at the Michigan State University Breslin Center, enjoy a performance at the Opera House in Sydney, Australia, or hear their granddaughter perform in a play at Alberta Kimball auditorium in Oshkosh, Wisconsin --all by merely switching their hearing aids to the telecoils *without ever having to make a volume adjustment!*

Thus, potential audio-video (AV) installers of hearing loops should be asked whether they have been trained in IEC standard hearing loop engineering and installation and whether they own the necessary equipment to verify that the loop meets this standard. Proper hearing loop installations will prevent dissatisfaction with uneven, poor quality installations and will delight users with clear, strong input wherever they choose to sit.

Following each and every hearing loop installation in my community we attend the worship services, lectures or performances with a T-coil equipped hearing aid and field strength measuring equipment to verify that the hearing loop sounds clear and is set loud enough. If needed, we also offer to the venues tips on hearing loop signage and accessibility to the loop system.

How does the IEC hearing loop standard relate to the telecoils in hearing aids?

In the most basic form, a hearing loop system consists of a loop of wire placed around the perimeter of an area and connected to an amplifier. An input signal is provided to the loop amplifier which drives an audio current through the loop in the form of a strong alternating current. As the alternating current from the amplifier flows through the loop it creates a magnetic field within the looped area and "induces" in the telecoil exactly the same signal that was picked up by the microphone feeding the amplifier. This magnetic field is a vertical magnetic field and, as such, requires that the telecoil be positioned mostly vertically in the hearing instrument for maximum induction. The strength of this magnetic field is measured in mA/m.

The IEC standard requires that the loop be capable of transmitting:

- A 100-5000Hz frequency response to a pink noise test signal
- A 1000Hz test tone does not vary more than +/-3dB in field signal strength in all of the seated area
- The average signal strength is 100mA/m with headroom for signals up to 400mA/m. Note that the 100mA/m signal corresponds to a 70dB SPL acoustic sound input and 400mA/m to 82dB SPL acoustic input

The average magnetic hearing loop signal of 100mA/m should therefore elicit an acoustic signal in the ear of the listener that corresponds to 70dB SPL input.

ANSI Standards and Telecoils

The ANSI spec sheets for the hearing aids should help the audiologist choose the best telecoils for use in a hearing loop. Fortunately many manufacturers position the telecoils vertically, which is the optimal telecoil position for hearing loop use. Another important hearing loop consideration is ensuring there is an equalized microphone and telecoil response. This means that the telecoil gain and frequency response matches the gain and frequency response characteristics of the microphone. Both conditions: a vertical telecoil orientation within the hearing aid and a matched microphone and telecoil response will ensure that the end user will hear well in an IEC adjusted hearing loop. Putterman (2010) confirmed that switching from a 70dB acoustic input to a 100mA/m magnetic input (the average magnetic signal strength in the hearing loop), results in similar SPL levels in the user's ear.

Telecoil performance can at times be unclear to audiologists since critical information is often lacking on the hearing aid specification sheets. For example, not all hearing aid manufacturers offer information about the positioning of the telecoil in instruments and some spec sheets only offer a telecoil strength value and lack a complete frequency response curve.

The ANSI SPLITS (Sound Pressure Level for an Inductive Telephone Simulator in ANSI 3.22-2009) test can be used to measure the strength of the telecoil. It's important to note, however, that a horizontally located telecoil in the hearing aid often provides a much stronger response in the test box than what is obtained in an induction loop system. This mismatch between telecoil response in the test box and telecoil performance in the hearing loop is because the ANSI SPLITS test measures the telecoil response at the so-called "sweet spot" setting. This may mean that the instrument is positioned horizontally or at an angle to ensure the most magnetic field pick up – and therefore not the way it is worn on the ear.

Hearing loop advocates recommend that each telecoil be tested with the SPLITS *and* the SPLIV test (one that measures the telecoil in a vertical/as is worn on the ear position and found in the ANSI 3.22 *Annex C-11*). Hearing aid manufacturers would be wise to include the curves for the typical acoustic (60 or 70dB SPL) and magnetic signal inputs (31.6 or 100mA/m) specified in the IEC hearing loop standard with the instrument in a vertical position in one graph. The ANSI standards committee was petitioned to make this change in the ANSI hearing aid tests, however, such a change can require years to take effect, yet it is critical information for audiologists who need to choose effective telecoils for use in hearing loops.

CLINICAL TIPS AND TRICKS FOR INDUCTION LOOP SYSTEMS

- To optimize telecoil performance with a loop system, the telecoil axis needs to be aligned vertically with the loop system.
- Some manufacturers allow you to select the desired telecoil orientation of custom instruments on the order form.
- Use telecoils that can be adjusted with the hearing aid software in order to fine tune the response.
- Typically, the telecoil response should match the microphone gain and frequency response. See Putterman, 2010 for more details
- Loop your waiting room, so you can demonstrate the telecoil feature prior to patient purchase.

Finding Hearing Loop Installers in your Area

What if there is no local audio company in your community trained in hearing loop installation? You may be able to obtain installation services from one of the national companies that install hearing loops over the country, but developing local expertise will ensure that hearing loops will be installed in many of your local venues.

When I started my hearing loop advocacy in my area, I formed a loop installation company with my husband, a retired engineer. Initially, I planned to bring the technology to my local community for the benefit of my patients and practice. It soon became clear that the AV professionals would be the key to furthering hearing loop installations in Wisconsin. A few phone calls to audio engineers quickly convinced them of the benefits to our clients, and they often agreed that the FM assistive listening technology, although well intentioned, usually ends up sitting in the back of sanctuaries, unused, with dead batteries, malfunctioning and/or unhygienic looking earphones.

Once the word got out, a growing number of audio and video firms quickly recognized that adding hearing loop installation services made good business sense in Wisconsin. In the past 2 years over a dozen audio engineers have been trained

by hearing loop manufacturers in proper IEC standard hearing loop installation techniques.

AV specialists benefit from working with local audiologists since we often are familiar with the venues and places of worship that could benefit from a hearing loop. We keep a log-book in my office of the different places of worship and meeting venues and list the clients who frequent the locations. This allows us –with their permission – to bring members of the same church in contact with each other, which improves their loop lobbying ability. Audiologists are also the professional of choice to introduce hearing loops during a service or by giving community speeches on the new hearing loops once installed. Few AV professionals know much about hearing aids and telecoils and would much rather leave the introductions up to audiologists. See Sterkens, 2011 for more information.

Guidelines about Programming and Configuring the Hearing Aid Telecoils Taking into Account Social, Environmental, and Hearing Concerns

It is important to familiarize yourself with the telecoils in the instruments you handle and understand how the microphone and telecoil sensitivity can be modified in the hearing instrument fitting software.

Depending on the degree of loss and the hearing loop application a telecoil-only program is suggested for clients who use open-canal (RIC) instruments. If used in situations where listening to one primary speaker is all that is required (which is usually the case in a lecture hall or place of worship) the telecoil-only setting is usually sufficient. A combination microphone-telecoil (MT) setting is recommended for watching TV in a home loop where some conversation needs to be possible with a spouse or other person while watching TV, thus, the hearing aid user can participate in conversation while listening to TV. For those hearing aid users with greater than moderate to severe hearing losses, those who typically utilize a closed ear mold, two hearing loop programs are usually offered: one that includes a blended MT program and one for telecoil only. If the listening situation has their frequent companion sitting on one side or another (e.g., at a movie theater, church, bingo, etc.) an “MT” program on the “direct speech listening” side, and T-only on the opposite ear is recommended. This latter setting reduces background noise pick up in the loop listening situation.

What patients are saying about hearing loops

One client, a retired attorney wrote:

“Loop technology has dramatically improved my hearing. I cannot say enough good about it. The elimination of

background noise means that I don’t have to sit in the front row all the time. I can actually watch the power point screen instead of staring at the speaker’s face for lip reading cues. My husband and I can watch television together again because we have our own separate sound systems...I heard of this technology from a friend - not my audiologist. Since my first ‘AHA Moment’ of listening to the clear amplified sound provided by the T-coil, I have been trying to spread the word about this remarkable technology....Hearing impaired people deserve to know about this technology and have more venues looped. It will enhance their quality of life - just as it has for me.”

Improving patient communication in challenging listening situations (such as churches and auditoriums) begins with the audiologist’s ability to become an advocate for the installation of loop systems. Beyond simply installing induction loop systems and selecting hearing aids with telecoils, it is critical that telecoils have the property orientation within the hearing aid and are programmed properly in order to optimize their performance with hearing loops. In addition, audiologists must work with AV engineers to ensure hearing loops are installed properly and, once the loop is installed, work with the facility to raise awareness about the importance of hearing loops for their hearing impaired clients. ■

References

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Dr. Juliëtte Sterkens, an audiologist in private practice since the 1980’s has received the Wisconsin Audiologist of the Year, The American Academy of Audiology Presidential Award, and the hearing industry Larry Mauldin award for her hearing loop advocacy on a local, state and national level. She is reaching out to audiologists, hearing aid users, parents of children who use amplification and/or cochlear implants, A/V professionals, designers and architects, clergy and other public venues. She serves on the HLAA/AAA Hearing Loop Task Force. Her work has led to over 120+ hearing loops in her community and other areas of Wisconsin, a number she expects to double by 2012. She can be reached via jssterkens@new.rr.com.