



## A history of sound in perfection

### An insight into Sennheiser's audiophile world

Wedemark, 13 May 2015 – The ultimate objective of modern headphones development is to reproduce sound that is as lifelike and direct as possible. That is also the aim of the engineers and acoustic developers at Sennheiser. For 70 years, the name Sennheiser has been synonymous with high-quality products, excellent sound and numerous innovations that have set new standards in audio technology. The audio specialist from Wedemark continues to design and manufacture headphones for the very highest audiophile demands, taking care to apply state-of-the-art and pioneering technology – always driven by the ideal of achieving sound in perfection.

### The milestones of headphones development



The history of audiophile sound began with the **HD 414**. The world's first open headphones revolutionised the headphones market in 1968. For the first time, the ears could hear in a way that they are accustomed to: open and free in space. The sound could travel to the ear drum much more naturally and clearly than in the closed models which were available at that time. With its new principle, the HD 414 triggered an absolute boom in headphones sales. More than 100,000 sets of headphones had already been sold by the end of 1969. Until today, the HD 414 remains one of the best-selling headphone models in the world, with a total of over 10 million units sold.

A further milestone followed when Sennheiser engineers combined the principle of open headphones with that of electrostatic transducer technology for the first time. Sennheiser's launch of the **unipolar 2000** model in 1977 caused a sensation in the audio world. Its principle was once again an innovation in audio technology. In the electrostatic transducer, a high voltage is applied to two mesh-like electrodes. Just like in a loudspeaker, this voltage causes a coated foil diaphragm to vibrate in time with the audio signal. This results in an extremely fine resolution and low total harmonic distortion. "Its frequency curve has a relatively deep curvature from 2 to 4 kHz. This is one of the reasons why these headphones generate an extremely spacious, detailed, transparent, airy and nevertheless powerful sound image in unprecedented quality," was how audio magazine 'Hifi-Stereofonie' sang the praises of the new headphones.

From a veritable flood of new headphones being introduced, one in particular stood out like a beacon in 1991: the electrostatic **Orpheus HE 90/HEV 90**. With the boldly ambitious mission to build the best



headphones in the world, Sennheiser developers once again set to work – and once again exceeded all expectations of the audio sector with these electrostatic headphones and their impressive tube pre-amplifier. Two platinum-coated diaphragms vibrate between gold-coated glass electrodes. A 500 volt tube amplifier provides enough power to allow the Orpheus to fully unleash its sound. Due to the extremely complex technology involved, the Orpheus was produced in a limited edition of just 300 units. These legendary headphones still remain the ultimate benchmark for audiophile listening and for all high-end models which audio specialist Sennheiser continues to develop.

### **The Sennheiser audiophile world today**

The latest audiophile products are all focused on guaranteeing perfect sound reproduction. With the **HD 800**, Sennheiser took up the tradition of the legendary Orpheus and has developed a set of high-end headphones that offer the ultimate in reproduction precision and unique spatiality. The key component of these dynamic headphones is a 56-mm transducer. Its innovative ring design reduces distortion to a minimum even with a transducer as large as 56 mm, as the vibrating part of the diaphragm is not a circular surface area but only an annular section. Significantly less material thus results in less inertia and less additional vibration in high frequency ranges. The result: benefiting from total harmonic distortion of less than 0.02 percent (at 1 kHz and 100 dB sound pressure level), the HD 800 with its brilliant trebles and precise bass offers a sound image of unsurpassed clarity.

The **HD 700** features a perfect combination of outstanding acoustic properties and sophisticated product design. Its styling and material selection have been thought through down to the finest detail in order to fully exploit the sound potential of the acoustic unit. The ear cups are designed in such a way that the sound waves are directed to the ears at a slight angle. This results in an impressively natural listening experience. The ear cups themselves feature a completely open design. This not only

ensures a highly transparent sound but also clearly displays the "heart" of these exciting headphones: the 40 mm Duofol transducer. Its powerful neodymium magnet systems guarantee detailed, lifelike audio reproduction from 10 to 42,000 Hz.

True classics in the Sennheiser high-end world are the **HD 600** and **HD 650**. Both models are open, dynamic, hi-fi stereo headphones with highly optimised transducer systems. Extremely light aluminium drive coils ensure excellent transient response, while neodymium ferrous magnet systems guarantee maximum efficiency. The HD 600 generates an exceptionally lifelike, spatial and accurate sound image with a frequency response of 12 to 39,000 Hz. With its deeper bass and pleasantly natural trebles, the HD 650's emphasis is on even greater expressiveness and emotion. The frequency response is 10 to 39,500 Hz.

The **IE 800** headphones from Sennheiser are the ones with the most innovations per square millimetre. The sound of the IE 800 can easily compete with that of the Sennheiser audiophile portfolio. These dynamic ear-canal headphones offer fascinatingly brilliant trebles, precise bass response and a detailed, lifelike sound image with a frequency response of 5 to 46,500 Hz. The centrepiece is the specially developed Extra Wide Band (XWB) driver. With a diameter of just 7 mm, it is the smallest wide-band sound transducer currently available in dynamic headphones.

Launching the **HD 630VB** at the HIGH END show 2015 in Munich, Sennheiser introduces its first closed audiophile headphone model. With these headphones, the audio specialist combines the brilliant sound of open audiophile models with excellent passive ambient noise attenuation. The HD 630VB delivers an impressively spatial sound image, while allowing for the users to enjoy their listening experience without any distractions. Specifically developed for the HD 630VB, Sennheiser's proprietary high-performance transducer is the "heart" of this model. It delivers the power for an intense bass experience which can be customized via a rotary bass dial according to the listening environment, the music being played and the user's individual preferences. The audio specialist's first closed-back audiophile headphones are a further milestone in the history of audiophile product development at Sennheiser.



Sennheiser's audiophile product range is rounded off by the headphone amplifiers **HDVD 800** and **HDVA 600**. Both the digital HDVD 800 and the analogue HDVA 600 offer a balanced sound image, maximum precision and impressive spatiality. The high-end devices have a fully symmetrical layout for operation with analogue audio sources, thus ensuring absolutely symmetrical signal transmission from the source to the headphones. Especially designed for the use with digital sources, the HDVD 800 features an extra high-quality Burr-Brown digital/analogue converter that converts digital audio data into analogue signals with a resolution of 24 bits and a sampling rate of up to 192 kHz. This enables the HDVD 800 to transmit the entire frequency spectrum of high-end audio sources without any loss of frequencies. Both headphone amplifiers harmonize perfectly with Sennheiser's audiophile headphone range, thus perfecting the Sennheiser sound experience.

### **70 years of innovation**

Sennheiser has made a significant impact on the evolution of audio technology over the past decades. Numerous patents and awards – including an Emmy, a Grammy, a Scientific and Engineering Award of the Academy of Motion Picture Arts and Sciences, and the Engineering Emmy's® Philo T. Farnsworth Award – bear witness to the company's unique innovative drive. This year, the audio specialist is celebrating its 70th anniversary. The company is now headed by a third generation of the Sennheiser family: today's CEOs, Daniel Sennheiser and Dr. Andreas Sennheiser, are the grandchildren of the company's founder, Prof. Dr. Fritz Sennheiser.

### About Sennheiser

The Sennheiser Group based in Wedemark near Hanover, Germany, was founded in 1945 and has gone on to become a leading manufacturer of microphones, headphones and wireless transmission systems. Sales in 2013 totaled 590.4 million euros. Sennheiser employs more than 2,500 staff worldwide and operates plants in Germany, Ireland and the USA. The company has a worldwide network of subsidiaries in France, Great Britain, Belgium, the Netherlands, Switzerland and Liechtenstein, Germany, Denmark (Nordic), Russia, Hongkong, India, Singapore, Japan, China, Australia and New Zealand, Canada, Mexico, and the USA. It also has long-established trading partners in other countries. Georg Neumann GmbH, Berlin, a maker of studio microphones and monitor speakers, and Sennheiser Communications A/S, a joint venture making headsets for PCs, offices and call centers, are also part of the Sennheiser Group.

More information about Sennheiser is available at [www.sennheiser.com](http://www.sennheiser.com).

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### Captions:

*HD 414.jpg*: The world's first open headphones revolutionised the headphones market in 1968.

*Orpheus.jpg*: Introduced in 1991, the electrostatic Orpheus HE 90/HEV 90 still remains the ultimate benchmark for audiophile listening and for all high-end models which audio specialist Sennheiser continues to develop.

*HD 630VB.jpg*: The HD 630VB is Sennheiser's first closed audiophile headphone model.