An Interview with Microphone Designer
Joerg Wuttke
By Ty Ford


Joerg Wuttke

Joerg Wuttke was born in Berlin in 1942. He studied electronics and telecommunications at Karlsruhe University, specializing in acoustics, and was teaching assistant to Professor Gunther Kurtze, the inventor of the shotgun microphone. He joined Schoeps GmbH as a research engineer in 1970, became its Chief Engineer in 1972, and is now its Technical Director.

Mr. Wuttke has been an active member of the Audio Engineering Society for many years, including publishing in the AES Journal and presenting papers and chairing workshops at conventions. In 1993 he was awarded an AES Fellowship. Since 1972, he has been a member of the DIN Standards Committee on Microphones and Headphones. He maintains an avid interest in listening to music and recording live concerts.

TF: Schoeps microphones are held in very high regard in the professional audio
community. From what I can see in the Schoeps catalog, the company doesn't make any large diameter capsules. Obviously you have a preference for small diameter capsules. Why?

JW: Please allow me to answer with a question: "Which is the more problematic transducer, the microphone or the loudspeaker?" I think we can all easily agree that in general loudspeakers are not as accurate as microphones. The reason is that they must be larger for they have to produce power. Especially at low frequencies large woofers must be used. Microphones do not suffer from this request. So, why should we make larger diaphragms than necessary? A condenser microphone can have any size and still transmit even the lowest frequencies if it is a pressure transducer (omnidirectional). Small diaphragm microphones also offer faster transient response by virtue of their lower mass and are not prone to the same phase non-linearity. In general, small diaphragm capsules offer greater accuracy when compared to large diaphragm capsules.

TF: Are smaller capsules better in all cases?

JW: No. If you need the lowest possible noise floor a large diaphragm microphone can help. By far not all of them, but some newer ones make use of the larger diaphragm for a reduction of the equivalent noise level for less than 10 dB-A. It is no coincidence that most small diaphragm microphones have diameters around 20mm. This choice allows (us) to satisfy the request for low noise in most high quality applications. As an example, our flat frequency response Omni MK2 Capsule with our CMC6 Class A Transformerless

Amplifier delivers very broad linear frequency response with high sensitivity and an equivalent noise level of only 11 dB-A.

TF: Can you think of situations in which a large diameter capsule would be more
effective?

JW: Large diaphragm microphones are much more effective in terms of impressing people by their size. To some people they can be beautiful objects of prestige. Due to the large ribbon and condenser microphones used by broadcasters and recording artists in the early days of recording we are accustomed to thinking that we need to see a large microphone in front of a performer. Given the choice, many people prefer to hear the benefits of a small diaphragm design.

TF: There is probably as wide a quality spectrum of small diameter capsules as
there is for large diameter capsules. Do you have any tips for buyers on how to
pick the best small diameter capsules?

JW: Look for a smooth extended frequency response that is flat at 20kHz. (For simple comparisons see: Rycote "Microphone Data Book"). It is surprising that people seem to be unaware that many microphones and especially large diaphragm microphones roll off above 16kHz while other users set a great store in reproducing above 20kHz. Furthermore it is important that the polar pattern should vary as little as possible as a function of frequency to avoid coloration: Finally all other quality parameters like low noise, low internal impedance etc. come into play for getting a really good microphone.

TF: Any other ideas you'd like to share?

JW: Users of large diaphragm microphones claim a "warm sound". This cannot be generalized, however, multipattern microphones in their cardioid position tend to loose their directivity at lowest frequencies hence emphasizing lower frequencies. I think that when users ascribe "warmth" or "big" to the sound producing qualities of a microphone they are not describing low frequencies but rather their perceptions about the characteristics of the sound. Try a high quality small diaphragm cardioid CMC64 or hypercardioid CMC641 next to a large diaphragm microphone. In double blind A/B listening tests you may be surprised by what you prefer!