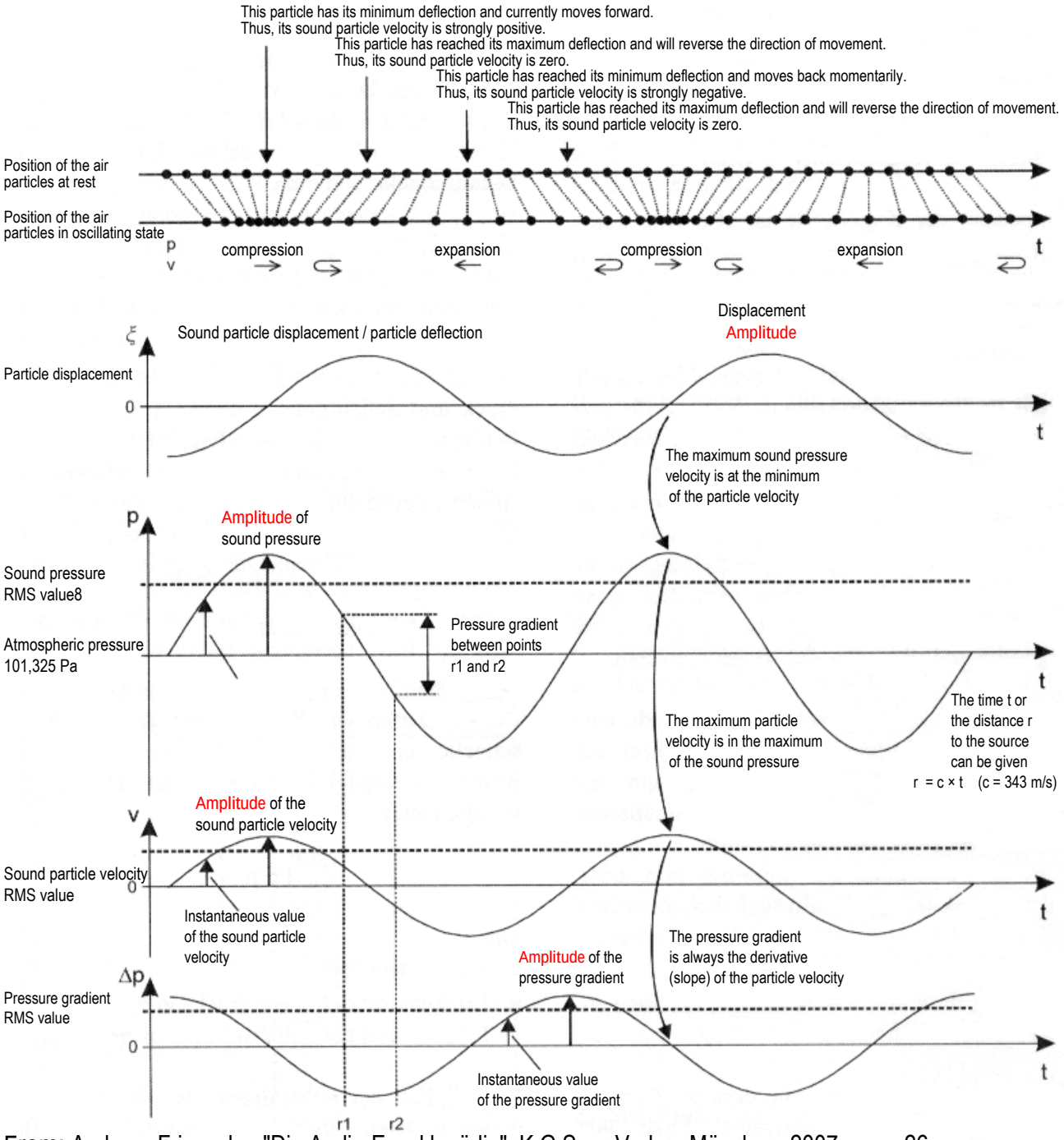
Soundfield Quantities of a Plane Wave – The Amplitudes

German: Schallfeldgrößen einer ebenen Welle – Amplituden: http://www.sengpielaudio.com/SchallfeldgroessenEinerEbenenWelle.pdf

UdK Berlin
Sengpiel
04.2009
Schall



From: Andreas Friesecke, "Die Audio-Enzyklopädie", K.G.Saur-Verlag, München, 2007, page 26

There are different amplitudes of sound. For a plane wave, sound pressure and particle velocity are in phase. The simple equation $p_{RMS} = p_a / \sqrt{2}$, explains acoustic pressure amplitude p_a (peak value) and sound pressure p_{RMS} Amplitudes of air particle displacement ξ, sound pressure p, sound velocity v, and pressure gradient Δp mean all different things as sound field quantity. Avoid the term amplitude using a sound energy quantity.

Some sound engineering publications wrongly assume that particle velocity and pressure gradient are the same.

All directional microphones exhibit the principle of the sound pressure difference Δp, called pressure-gradient, where besides the front of the microphone diaphragm more or less also the reverse side of the diaphragm is covered by sound. Therefore these sensors are called pressure-gradient receivers or pressure-gradient microphones and have little to do with particle velocity v.

Look also at: "What is amplitude?" http://www.sengpielaudio.com/calculator-amplitude.htm
"Relationship of acoustic quantities associated with a plane progressive acoustic sound wave ":
http://www.sengpielaudio.com/RelationshipsOfAcousticQuantities.pdf
Johannes Kammann, "Sound particle velocity and pressure gradient are not the same (German)":
http://www.sengpielaudio.com/SchallschnelleIstNichtDruckgradient.pdf
Manfred Hibbing, "Sound particle velocity, pressure gradient and microphones (German)":
http://www.sengpielaudio.com/SchallschnelleDruckgradientMikrofone-HibbingMails.pdf