

## Inverted dome tweeter

**T**he inverted dome tweeter a Focal hallmark is perhaps the perfect transducer. This design permits very high efficiency, precision and energy.

The particular advantage of the inverted dome tweeter is the optimization of the mechanical coupling between the voice coil and the dome. The voice coil is fixed at mid-height on the dome and uniformly moves the cone entire surface. The positive dome is only joined at its edge, causing it to be inactive beyond 16kHz for a flexible surface. The inverted dome directly radiates into the air, with maximum efficiency, which is translated by an extremely precise soundstage. The dome's response curve is clearly more linear than that of any positive dome. It provides better space dispersion and very low directivity, contrary to ribbon tweeters.

The inverted dome tweeter offers unequalled dynamics, enabling sound engineers to very precisely control compression. The image precision (height, width and depth) is outstanding and makes the positioning of each element very easy, as well as allows one to exactly assess the reverb tails.

### Beryllium

Due to its incredible rigidity, Beryllium represents the ultimate material for a tweeter dome. Focal, after two years of research and development, produced a world first: a pure Beryllium inverted dome, able to cover more than five octaves (1000Hz - 40kHz).

You may ask yourself why do we strive for an extended response at



"W" composite sandwich cone

"W" composite sandwich cone mounting

40kHz, if the human ear can only hear up to 20kHz? If you can extend frequency response, you will improve the perception of transients and other micro details.

As well, the linearity of the speaker's response curve is mainly a function of three opposite parameters: lightness, rigidity and damping. To this day, only one material permits a joining of these parameters: Beryllium. For domes with identical masses, Beryllium is seven times more rigid than Titanium or Aluminum, the latter two well known for their rigidity. This results in a sound wave propagation three times faster than Titanium and two and a half times faster than Aluminum. In the end, the linearity of the frequency response curve, the acoustic transparency and the impulse response of the Beryllium tweeter are maximized and offer near-perfect sound.

### "W" composite sandwich cone

The "W" composite sandwich cone permits total optimization of the frequency response curve, thanks to the total control of three key parameters: lightness, rigidity and damping. At Focal, the letter "W" means Glass/ Glass, as it usually has two sheets of woven

glass tissue that are "sandwiched" onto the structural foam core. The glass tissue benefits from the incredibly fine weaving of very long fibres. This choice offers a mass and a size clearly inferior to those in Aramid fibers or other Kevlar fabrics, which generate coloration in the midrange. It's also important to note that the molecular bond between the resin and the glass is greater than that obtained with Aramid fibres. The cone structure is more homogeneous and its behavior in flex is much more superior.

These unique characteristics of lightness and rigidity provide control of the signal transmission speed inside the material. Adjusting the thickness of the structural foam allows a very precise control of the "W" cone's damping. The variation of the number of glass fibre sheets and the thickness of the central foam can easily optimize the cone's behaviour according to the desired frequency range.

When listening, the sound of the "W" cone is entirely transparent, has an excellent phase response and has a very low distortion rate (rigidity 20 times higher than Kevlar or Aramid fibre). PS2