FOCAL
the spirit of sound

PROFILE
Technical paper

Profile Structure

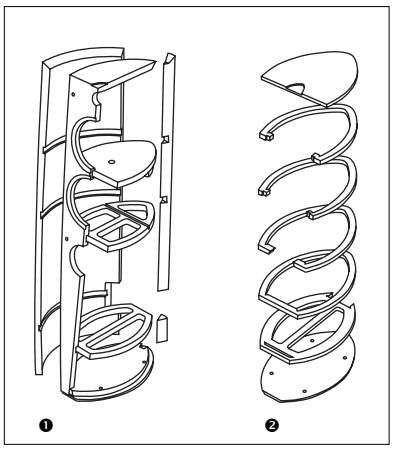
Historically, Focal has developed a strong technological identity. In order to offer optimal performance and technical breakthrough, loudspeaker design had to bear with technical limitations. Profile's approach is totally different, with a broader, more "soft tech" angle, technology – obviously in view on a Focal product – blends in better and is both less intrusive and prominently displayed thanks to a flawless and innovative design. In the meantime, Profile perfectly accomplishes its acoustical duties.

Because of its creative approach, Profile is an ambitious challenge for Focal, for the first time style is guiding the project. Merging thoroughly with the object, technology becomes another tool in the design project. The overall shape is undoubtedly bold and complex but balanced. The loudspeaker is formed by two curved shells closing in, on all its height, on a "back bone" support, only the speaker frame remaining flat.
Traditional bending technique, obtained through sequential deep cuts that facilitate shaping, had to be given up right away, the resulting structure was not homogeneous and widespread vibrations were impacting auditory perception, so, torn between technical limitations and business requirements, the Profile project found itself in a dead-end. Our engineers had to find cutting edge solutions in order to overtake these limitations and finally came up with a new, innovative manufacturing process, which clears design hurdles and delivers state of the art acoustical performance.

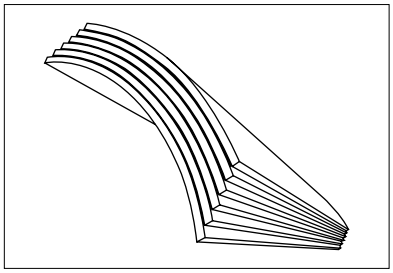
HDF structure is achieved through binding six 3mm thin MDF layers and pressing them against a mold in order to acquire the desired shape for the loudspeaker. It is interesting to notice that the "pile up" principle matches the composite material "W" sandwich cone used on Profile.
Repeated wood panels separated by resin layers confer extreme rigidity to the compound. Inner resin layers also play a central function in suppressing vibrations. Going from a different density layer to another one, vibrations are automatically damped.
Our composite panel structure brings outmost satisfaction in rigidity and vibration suppression. But the loudspeaker's shape itself, induces an optimal mechanical behaviour :

- Egg-like shapes favour rigidity, Profile is able to withstand strong internal pressure without generating coloration or parasite humming in low frequencies.
- The loudspeaker's egg-like section preserves it from an aliasing effect, which appears when a signal is generated between the driver and the back panel with a slight delay (1ms).
  That short residual delay is detrimental to perception. Profile's shape provokes the bursting of that back wave which is then almost totally dispersed in the loudspeaker.
- The edgeless section also prevents loudspeaker's resonance, stationary sound waves are totally carried and absorbed by the loudspeaker and are automatically damped by the lack of steep angles.

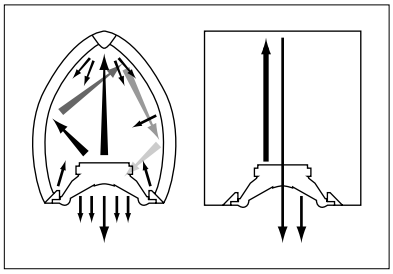
Considering these features, Profile reveals itself to be relevant to critical listening. Omega structure marks real progress in terms of perception and transparency. Midrange is clear, rich and refined. Stereophonic image accuracy and range are astonishing. However, it is the low frequency driver, which improves in an even more spectacular manner, reaching total lack of colorations. What you get is a sparkling yet deep, high accuracy bass, with an extremely acute pulsing and alive.



❶ Split view of Profile 918. Both HDF bended shells close in on the back bone . Notice the internal structure elements which further reinforce the loudspeaker rigidity.
❷ None of Profile distinct sections are identical, nor in their shape or volume. Therefore, preventing inner resonance and coloration regarding stationary waves.



The curved HDF bended panel is made up of six 3mm MDF layers binded by resin : this sandwich structure is naturally rigid and prevents vibration spreading by using different density layers, so as to get a reasonably flat low frequency response.



On a regular loudspeaker, the back wave generated by the driver hits the back panel and bounces back through the cone (with a very slight decay) which causes undesirable resonance. With Profile, that wave is dispersed through the loudspeaker.

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