Focal Electra 1008 Be2

LOUDSPEAKERS

Focal started off solely as a manufacturer of high-quality drivers, which it sold to high-end speaker manufacturers right around the world, either specially branded with their own name or, sometimes, under the 'JM Labs' name, or under the name 'Focal'. (The letters 'JM' are the initials of Focal's founder, Jacques Mahul.) In more recent years Focal has severely curtailed this side of its business and now concentrates almost exclusively on building complete loudspeaker systems, and the result has been tremendously successful for this French company, because it's seen the brand grow into one of the audio industry's best known and most respected. Commensurate with this status, Focal now offers a comprehensive line-up of models that covers all the bases from 'designer desktop' to 'lifestyle', to the *über* high-end Utopia range.

THE EQUIPMENT

When it comes to drivers, one of Focal's many claims to fame is its use of a rather exotic, very expensive and exceedingly difficult-to-manufacture material: Beryllium. Focal recognised Beryllium's potential to be a superb tweeter diaphragm material due to its inherent strength (minimum break-up) and feather-light weight (fast transient response). The technical comparison with an equivalently-sized aluminium dome is illuminating: compared to an aluminium dome of the same size and thickness, a beryllium dome is 30 per cent lighter, 5 times more rigid and has double the internal damping.

The Focal Electra 1008 Be2 uses a newly-designed 27mm Beryllium tweeter which has a precisely-calculated space (Focal uses the acronym 'IAL', which stands for Infinite Acoustic Loading) to describe this acoustic space) engineered behind its inverted dome that allows the tweeter to be crossed-over at a lower frequency than usual in order to ameliorate potential midrange driver beaming.

Why is the tweeter's dome inverted (that is, rather than facing 'out' like most tweeter domes, it faces 'back' into the tweeter)? It's because Focal says that an inverted dome allows far superior mechanical coupling between the dome and its voice coil, which Focal claims improves sound quality. However, the company also claims that this superior coupling also improves the tweeter's sensitivity, its efficiency and its power handling ability.

With normal dome tweeters, the dome is driven at its periphery, so the voice coil is the same diameter as the dome. With Focal's inverted dome, however, the voice coil is smaller than the dome and attached about halfway up the dome's radius. You can appreciate this is extraordinarily difficult to do because it's so hard to position the coil correctly on the dome. With a normal dome you just make a little lip around the dome and it will sit neatly on top of the coil, whereas with Focal's inverted dome, this isn't possible. The smaller voice coil is consequently lighter than a typical tweeter voice coil, but the smaller diameter also makes it easier to focus the magnetic energy in the gap, for superior sensitivity and power handing. The tweeter sits flush on a brushed aluminium baffle plate that controls resonance and deleterious vibrations.

The bass/midrange driver is rated at 165mm diameter (nominal) and has a cone made from Focal's famous 'W' material that features multiple layers of glass coating and foam. The reason it's called 'W' material stems from the French word for glass, which is *verre*. Because there are two layers of glass, it's known as *verre verre* construction, which abbreviates to two capital Vs together, as in VV, which in turn looks like a W.

the voice coil is smaller than the dome and attached about halfway up

The advantage of 'dual material' cones such as Focal's 'W' cone is that whenever you design a loudspeaker, one of the most important variables you need to punch into your Thiele/Small speaker design software program is the mass of the speaker cone. If you choose to use a cone made from any single

material, whether it's paper or polypropylene or a some type of alloy, the minute you need a particular weight to suit your equation, it then means you have to accept a specific cone thickness and because the stiffness and thickness of the cone are inexorably linked to the cone's weight, it all starts to become very limiting. However, with a layered cone you get to play around with lots of variables. This is why Focal has various 'flavours' of its 'W' cone.

Focal's most basic W cone is a sandwich consisting of a layer of foam with a layer of glass either side, but depending on the speaker the cone will be used in, Focal varies the thickness of the foam, and also the number of layers of glass. Some cones have two layers of glass on each side of the foam rather than one on either side; others have two layers on one side and one on the other, while some W cones (mostly those used in midrange applications) have two layers of glass on the front side of the cone and none at all on the rear. One other advantage of a layered cone is that the multiple layers tend to prevent sound energy inside the cabinet from coming out 'through' the cone. The effect of this can be heard as significantly greater depth to the soundstage.

So far as the size of the driver in the Electra 1008 Be2 is concerned, the figure stated by Focal is actually the total external diameter of the chassis itself. The mounting hole dimension is 156mm, while the important T/S diameter, which gives Sd (which is one of the other important parameters you plug into the Thiele/Small model when designing a speaker) is 134mm, which gives an Sd of 141cm². (Actually, a little less, because the driver does not have a dustcap; instead, a concave-topped pole-piece protrudes through the centre of the cone, extending up from the voice coil.)

These 1008 Be2's bass/midrange driver and tweeter sit in an enclosure that I regarded as an example of industrial design at its finest. Focal engaged *Pineau & Le Porcher*, a French design house that has collaborated in several other Focal models, to design the exterior of the 1008 Be2… and it shows. These speakers are absolute stunners. Their form

and fit and finish is absolutely first class and the balance between gloss baffle, curved aluminium, angular wood-coloured non-parallel sides (several finishes available) and smoked glass top makes the Electra 1008 Be2 a pleasure to look at and to touch. The attention to detail is extraordinary; I'm talking *immaculate* panel joinery, high quality materials and features—such as the custom speaker binding posts, the etched Focal logo on the glass top, the eleven coats of clear lacquer, even the classy rear baffle model denomination plate… the list of design niceties is long.

The Electra 1008 Be2 is a rear ported design with an unusual slotted port that spans the width of the rear panel (foam bungs are provided for contouring the bass for a modest level of room tuning). The Electra 1008 Be2s work best on stands. While a good solid stand is absolutely *de rigueur*, and Focal obviously recommends its S108 stands, you could happily substitute any other well-made stands, ideally so heighted that they place the 1008 Be2's tweeters at your seated ear level. Each cabinet measures 385×264×350mm (HWD).

Focal specifies the –3dB point of the Electra 1008 Be2 design at 46Hz and says the tweeter's response stretches to 40kHz. Sensitivity (2.83V/1m) is quoted as 89dBSPL and the nominal impedance at 8Ω.

IN USE AND LISTENING SESSIONS

What dimensions were these speakers again? They're surely not stand-mount size, right? Well yes, they are, but they certainly don't sound it. The small Electra 1008 Be2s can do big, in terms of spatial scale and bass prowess. Recording quality permitting, the Be2s disperse a rather large soundstage with realistic width, height and depth, with images locked-in and

FOCAL ELECTRA 1008 Be2
Loudspeakers

Brand: Focal
Model: 1008 Be2
Category: Stand-mount Loudspeakers
RRP: $6,999
Warranty: Five Years
Distributor: Audio Marketing Pty Ltd
Address: Unit14L, Lower Gibbes St. Chatswood NSW 2067
☎ **(02) 9882 3877**
🖷 **(02) 9882 3944**
✉ **info@audiomarketing.com.au**
💻 **www.audiomarketing.com.au**

- Superb sound quality
- Immaculate fit and finish
- Attractive design

- Bass depth limitations in large rooms
- Need solid high-quality stands

LAB REPORT

Readers interested in a full technical appraisal of the performance of the Focal Electra 1008 Be2 Loudspeakers should continue on and read the LABORATORY REPORT published on page 82. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

Lab Report on page 82

focused. In fact, sound cues on some recordings were thrown well clear and laterally of the speaker positions. The wide dispersion design and curved front baffle are obvious key design elements facilitating such spacious performance.

Now, the laws of physics will mandate a low frequency limit based on the size of the enclosure, its port tuning and bass driver. However, Focal has tweaked the tweeter/crossover/midbass driver equation to such an extent that in the appropriately-sized room, the quality, depth and power of the Electra 1008 Be2 bass registers belies the speakers' dimensions. The W-cone punches out rhythmically fast, detailed and tonally correct bass pulses that can compete with the output of small floor-standers. But there is a limit; play very bass heavy material and the Electras do admirably well, albeit with a subtle compression in dynamic range. Mind you, I am nitpicking, and I reiterate, the low end here is extraordinary for a speaker of this size (cabinet/driver ratio).

As is my wont, I attempt to bamboozle the loudspeakers I review by playing highly complex music in order to ascertain a speaker's ability to resolve and dissect mixes while maintaining a sense of musical coherence. Passed with flying colours, Electra. Heavy orchestral, busy jazz, multi-instrument world, you name it, I tried it and the Electras were capable of resolving these challenging hurdles, with instruments separated yet coalesced into a musical event.

Yet another strength at the Electras' disposal is the thoroughly enjoyable way they present astonishing levels of detail, both in the mid and high frequencies via the advanced midbass drivers and inverted-dome Beryllium tweeters. Within the context of my reference system the Electra's midrange features a tonally warm, natural and rather seductive presentation (even slightly, but attractively, laid back) that invites long listening sessions. Oh, and that Beryllium tweeter extends upwards beautifully, providing realistic ambience, delicate micro-details and harmonic content.

CONCLUSION

The massive research and development program Focal embarked on when it was engineering its flagship Utopia range has seen some of that technology trickled down to its Electra range which, after all, is only a single rung down Focal's tall and distinguished product ladder. Technologies such as Beryllium and W-cone have had a remarkable effect on the 1008 Be2's performance. Superficial eyes could see the $6,999 Electra 1008 Be2 as a tad expensive for its size, but wiser enthusiasts and those who relish quality would be enamoured by its gorgeous styling, impressed by its impeccable fit and finish and attention to detail... and amazed by its extraordinary musicality and overall performance. Focal's Electra 1008 Be2 is an absolute must-audition. *Edgar Kramer*

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TEST RESULTS

The frequency response plotted by *Newport Test Labs* and shown in *Graph 1* shows the Focal 1008 Be2's response as extending from 68Hz to 30kHz ±3dB. Well, actually, to be precise, it's the graph that stops at 30kHz—the Focal's beryllium dome tweeter's response obviously extends well above 30kHz, but this is the test laboratory's instrument calibration limit. (That is, the lab can make measurements above this frequency, but the equipment it uses is only calibrated to traceable standards at frequencies below 30kHz.) As you can see from the caption underneath the graph, it's actually been 'assembled' from ten different measurements of the Focal.

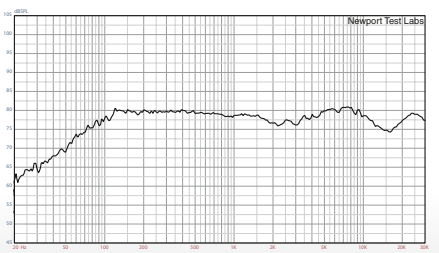
The extension and linearity of the response are obvious from the graph. Also obvious—and important—is the overall balance of the response, in that the bass, midrange and treble areas are all quite even. The response from around 110Hz up to 1.5kHz is both flat and linear but rolls off slightly before climbing up at 5kHz to regain the 'average' overall level, after which it rolls off again above 10kHz to 'bottom out' at –3dB at 16kHz before climbing again to peak at 24kHz before starting to slowly roll off again.

A highly detailed view of the high-frequency performance of the Focal is shown in *Graph 2*, this time showing the differences in the responses with the tweeter's protective mesh screen off, and with it on. You can see that the differences are very, very minor. So minor that I would recommend leaving the mesh in place at all times. I'd also recommend keeping the lower grille, which protects the bass/midrange driver, on at all times as well.

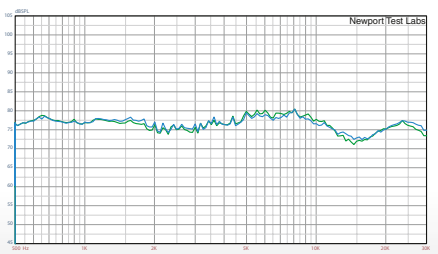
Graph 3 shows the low-frequency performance of the system. The red trace is the output of the rear-firing bass reflex port, while the black trace is that of the bass/midrange driver. You can see that the peak output frequency of the port is a little higher than the minimum driver output, but there's not a lot of difference, so the tuning is accurate. The woofer response holds up very well all the way down to around 90Hz, after which it rolls off sharply, as I'd expect. The port's output rolls off steadily either side of its peak output (at 55Hz), but there is some unwanted output visible up at 500Hz and then above 1kHz, which is energy coming from the rear of the bass/midrange driver cone. It's low enough down that it's of no cause for concern, and the port faces away from the listening position in any case.

The impedance curve shows the enclosure is tuned to 52Hz and that the impedance is, for the most part, above 6Ω. However, the impedance trace dips below 4Ω between 155Hz and 285Hz, for a minimum of about 3.7Ω at 200Hz. According to the International Electrotechnical Committee's Loudspeaker Standard (IEC 268-5) this puts the 'nominal' impedance of the design at a little over 4Ω, so the nominal impedance is actually 4Ω rather than the 8Ω stated by Focal. Still, the speaker will be easy to drive, with the impedance staying above 6Ω almost everywhere else across the band, and with a benign phase angle. Drive is also made easier by the Focal 1008 Be2's high efficiency. *Newport Test Labs* measured it as 89.2dBSPL at one metre for 2.83Veq, which is very high for a speaker with such a small cabinet.

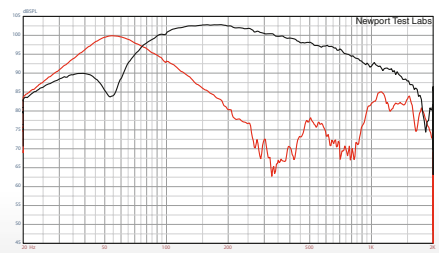
Graph 5 shows a complete in-room pink noise analysis, measured at nine places in front of the speaker, with an upper graphing limit of 10kHz. You can see that this trace (which is unsmoothed) is within 2.5dB from 95Hz right up to the graphing limit. That is, 95Hz to 10kHz ±1.25dB. The 'shape' of the graph is exactly the same as shown in *Graph 1*, with a minor suck out centred at 2kHz. ***Steve Holding***



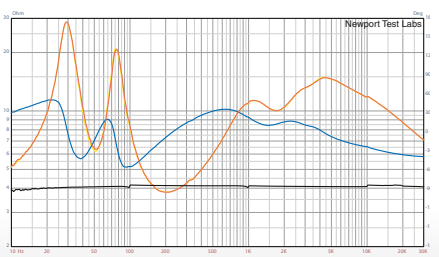
Graph 1. Frequency response. Trace below 1kHz is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. This has been manually spliced (at 700Hz) to the gated high-frequency response, an expanded view of which is shown in Graph 2. [Focal1008 Bell]



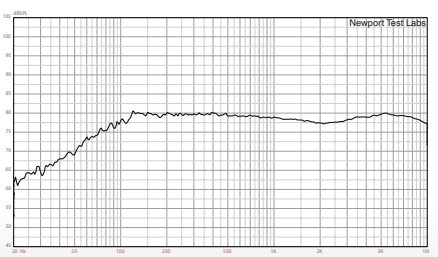
Graph 2. High-frequency response, expanded view. Test stimulus gated sine. Microphone placed at three metres on-axis with dome tweeter. Lower measurement limit 500Hz. Grille Off (Blue Trace) vs Grille On (Green Trace). [Focal Electra 1008 Bell Loudspeaker]



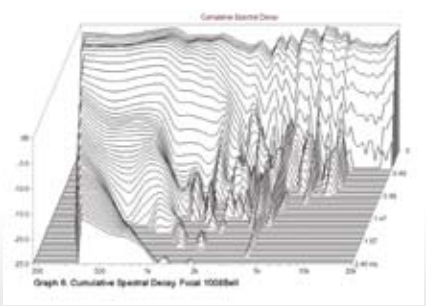
Graph 3. Low frequency response of bass reflex port (red trace) and woofer. Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas. [Focal Electra 1008 Bell]



Graph 4. Impedance modulus of left (red trace) and right (yellow trace) speakers plus phase (blue trace). Black trace under is reference 4-ohm precision calibration resistor. [Focal Electra 1008 Bell]



Graph 5. Averaged frequency response using pink noise test stimulus with capture unsmoothed. The trace is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter. [Focal Electra 1008 Bell Loudspeaker]



Graph 6. Cumulative Spectral Decay. Focal 1008Bell