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Focal Stella Utopia EM Loudspeaker

The Essence of Musical Engagement

Robert Harley

The French loudspeaker manufacturer Focal was never on my radar as part of the top echelon of the world's best loudspeaker-makers. That's because my only exposure to its most ambitious efforts was at two consecutive Rocky Mountain Audio Fests, where I heard Focal's flagship Grande Utopia EM. Although the Grande Utopia sounded excellent at the Denver shows, problematic rooms kept it from realizing its full potential.

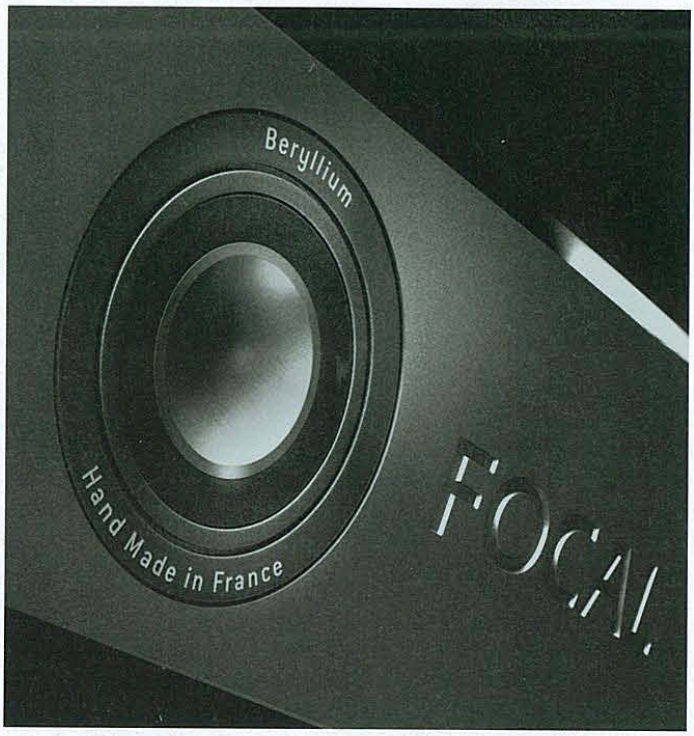
A visit to Focal's factory last April gave me a new appreciation for this company and its products. I heard the Grande Utopia EM, its predecessor the Grande Utopia, and the Stella Utopia EM at five different venues, ranging from factory demo rooms to a dealer showroom. I also heard, in one listening session, eleven Focal models from the Chorus 807V ($1095 per pair) to the Grande Utopia EM. Although all the models sounded good, it was the $90,000 Stella Utopia EM that stood out for me as special. It had a beautiful combination of resolution and ease, of warmth and definition, and a striking ability to foster musical involvement. Hearing my own reference tracks reproduced by the Stella suggested to me that this was a world-class loudspeaker that deserved a full audition.

Overview

The Stella Utopia EM is the second from the top-of-the-line in Focal's Utopia series, just below the $180,000 Grande Utopia EM (reviewed in Issue 193). The Grande Utopia is very similar to its half-price sibling, the differences being the addition of another woofer, woofer size (16" vs 13"), and the Grande's articulating cabinet, which can be adjusted along an arc to achieve time alignment at the listening position regardless of listening distance or listening height. The Stella Utopia EM (hereafter the Stella) is a three-way design employing a 13" woofer, dual 6.5" midrange units, and a 1" beryllium inverted dome tweeter. All the drivers are designed and manufactured in-house. The woofer is unusual in that it uses an electromagnet rather than a fixed magnet (see sidebar for details). This technique requires an outboard power supply for each speaker to provide current to the woofer's electromagnetic coil. The supply is a small unit that plugs into an AC outlet and, thence, into the base of the Stella. A signal-sensing circuit automatically turns off the current to the woofer's electromagnetic coil when the loudspeaker is not playing music. Each of the Stella's drivers is housed in a separate cabinet, with the woofer enclosure canted backward and the two upper enclosures canted forward in an accordion-like arrangement to align the drivers' acoustic centers. The woofer is ported through a vent between the woofer enclosure and the base. Two pairs of input terminals are provided on the base for bi-wiring. The system is flat (-3dB) to 22Hz, with a -6dB point of 18Hz. The Stella's impedance is 8 ohms nominal, with a minimum impedance of 2.8 ohms. Sensitivity is a high 94dB, enabling the speaker to be driven by amplifiers of moderate output power.

The midrange drivers feature Focal's patented "Power Flower" magnet arrangement. Rather than use a single magnet, the Power Flower technique positions multiple magnets around the voice coil in an array that focuses the magnetic flux in the gap as well as reduces magnetic leakage. The cone is Focal's third-generation "W" sandwich composite that combines a Rohacell core with layers of resin-impregnated glass tissue (see the accompanying article on the Focal factory for more detail on the driver's design and construction).

The beryllium inverted dome tweeter is quite sophisticated. The magnet behind the dome is shaped like that of a jet engine to avoid disturbances in air circulation. The dome's rear energy is loaded by a tuned cavity that simulates a quasi-infinite volume of air, eliminating the distortion that occurs when the dome's rear wave is reflected back to the dome. The magnet structure is made from five separate sections of neodymium, which supply enough magnetic-field strength to give the tweeter a sensitivity of 95dB. The tweeter has a very low resonant frequency of 528Hz, and has a very wide bandwidth of 2.2kHz–40kHz. (It is no surprise that Focal has developed such sophisticated driver designs. The company was founded more than 30 years ago as a driver-development laboratory, and for decades supplied raw drivers to some of the world's most prestigious loudspeaker-makers.) The drivers were designed with the view that the better behaved they are, and the wider the bandwidth of linear behavior, the simpler and more sonically transparent the crossovers can be. That is, the crossover is allowed to be only a filter, not a filter and a circuit that corrects driver problems. Consequently, the crossover uses relatively few components.



The Stella was unusually communicative musically, but not because of any specific sonic characteristic

The enclosure is made from layered MDF, as thick as 2 3/8" in places, and internally braced. In an era in which most advanced loudspeakers are based on exotic cabinet materials and construction techniques, MDF seems pedestrian. But Focal argues that MDF's combination of stiffness and self-damping make it the ideal material for a loudspeaker enclosure.

In a departure from most modern speakers, the Stella offers the user a wide range of adjustments to tailor tonal balance. The back panel of one midrange enclosure opens to reveal four moveable jumpers, each of which can occupy one of three positions. The first jumper affects the woofer's Q (see sidebar). The second jumper adjusts the midrange drivers' slope at the transition to the tweeter, affecting the level of midrange energy between about 1.5kHz and 3kHz. The first of the two tweeter adjustments is a shelving filter that controls the tweeter level, with the option of a 1.8dB attenuation or a 0.8dB boost. The tweeter's slope at the lower end of its passband can be adjusted, varying the amount of energy roughly between 2.2kHz and 3.5kHz. Finally, you can adjust the bass level with a three-position rotary switch on the EM woofer's outboard drive unit. Needless to say, all these controls are interactive with the loudspeakers' positions in the room and their toe-in, necessitating quite a bit of experimentation to find just the right setting.

The speaker is finished in black, white, or gray paint, with a black baffle and a brushed-aluminum panel facing the tweeter module. Custom colors are also available. The smoothness of the surfaces and the paint quality itself are good, but not up to the same standard as, for example, Wilson loudspeakers.

Listening

Setting up the Stella was straightforward, but dialing them in took some time. The beryllium tweeter can be a little hot on-axis, but the combination of toe-in adjustments and the six possible tweeter settings (the rear-panel jumpers mentioned previously) allowed me to get the perfect treble balance. I ended up with the tweeter slope in the flat position, but with the tweeter level shelved down, and a toe-in that caused the tweeter axes to cross several feet behind the listening position. I set the woofer Q at the minimum position to remove a bit of room-induced bass bloat, and the three-position woofer level at its lowest output. The two slope adjustments were left in the "flat" position.

I usually begin a review's sonic description with the product's most salient characteristic, but in the case of the Stella, the design is so well balanced that this convention was upended. The Stella was unusually communicative musically, but not because of any specific sonic characteristic—that is, the Stella didn't strike me as being the most transparent and neutral loudspeaker I've heard, although it came close. Neither did it have the best bass, but the bass was outstanding. The soundstaging was spectacular, but just a little short of state-of-the-art. The dynamics were exemplary, but didn't quite push the envelope in what's possible in today's loudspeakers.

But what the Stella did, consistently and unfailingly over many months, was create an immediate and deep sense of involvement with the musical expression. Some products, no matter how "impressive" they appear on a sonic basis, seem to inhibit turning

off the brain to all thoughts except the musical expression. These are components that you can admire on an intellectual level for their sonic achievement, but not fully enjoy on a musical level over the long term. Conversely, the Stella Utopia had a seemingly magical ability to quickly turn off all awareness of the electro-mechanical contrivance that is a playback system, and immerse me in the music. This wasn't a loudspeaker that caused me to think "Listen to that resolution" or "What transparency!" Rather, I found myself realizing just how much the sense of swing in *Soular Energy* is driven by Ray Brown's bass playing. Or how exquisite Dexter Gordon's phrasing is on the album *Great Encounters*. Or what a beautiful, burnished, rich tone Arturo Sandoval coaxes from his trumpet. Or how expressive Jeff Beck's playing is on "Cause We've Ended as Lovers" from *Performing this Week . . . Live at Ronnie Scott's*, particularly the way he modulates the volume of each note. The list could go on and on. The point is that immediately upon turning on the system, I felt like I was in the presence of contemporaneous music-making, not sitting down in front of a hi-fi system.

Although the Stella's powerful musicality defies forensic dissection, this is, after all, a review in a hi-fi magazine. So, starting with tonal balance, the Stella (as I had them set up and tuned) was extremely smooth and neutral, with just the right balance of treble energy. The ability to reduce the tweeter level allowed more toe-in

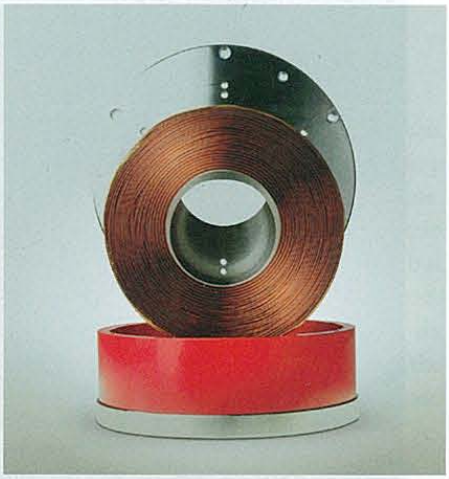
Electromagnetic Drive in the Stella Utopia EM

The "EM" in the Stella Utopia EM's name stands for "electromagnetic," the drive principle employed in the woofer. Before looking at how this works, let's review the operating principle of a conventional moving-coil driver.

The power amplifier drives alternating current (the audio signal) through the voice coil, generating a varying magnetic field around the coil that is an analog of the audio signal. The varying magnetic field changes its north-south orientation at the audio signal frequency; because the audio signal is alternating current, the current flow reverses direction at the frequency of the audio signal. Send 1000Hz to the driver and the current flow through the voice coil reverses direction 1000 times per second. This reversing magnetic field created by current flow through the voice coil alternately pushes and pulls against the fixed magnetic field generated by the driver's permanent magnet, causing the voice coil to be pulled back and forth, and with it, the cone.

This approach, used in virtually all modern moving-coil loudspeaker drivers, runs up against the laws of physics. Specifically, the magnetic-field strength generated by the fixed magnets is limited, which in turn places restrictions on the cone weight, how low in frequency the driver will play, and how sensitive the driver is. A heavy cone goes lower in frequency (all other factors being equal), but requires greater magnetic-field strength surrounding the voice coil to drive it.

Focal's solution to this physics problem is to replace the driver's fixed magnets with a large coil that functions as an electromagnet. The coil is driven with direct current from an outboard power supply that plugs into an AC outlet. This current flow through the coil creates the magnetic field against which the voice-coil–generated magnetic field pushes and pulls. The electro-magnet produces a magnetic-field strength in the gap (the area in which the voice coil sits) nearly double that of a conventionally driven woofer (1.75 Tesla for the EM). Consequently, the EM's diaphragm can be heavier (giving it a lower resonant frequency) yet simultaneously more efficient. Moreover, the woofer's bass output can be adjusted by varying the current through the electromagnetic coil. This is accomplished in the EM via a rotary switch on the outboard supply that drives current through the



electromagnetic coil. One can thus adjust the EM's bass output to better integrate the system into a variety of listening rooms.

The result of electromagnetic drive is a woofer with very high sensitivity (97dB for 1W) but very low resonance (24Hz). In other words, the woofer delivers lots of very low bass with very little input power. Over and above the greater weight of the woofer, the price of this performance is the need for the outboard supply that has to be plugged into an AC outlet. The EM's 13" woofer weighs 63 pounds, 48 of which is the electromagnetic coil. **RH**

System Q

Just as a struck bell produces a certain pitch, a woofer in an enclosure will naturally resonate at some frequency. The nature of that resonance is an important characteristic of the loudspeaker, and one that greatly influences its sound. The term Q, for "quality factor," is a unitless number that expresses how a woofer resonates in an enclosure.

Specifically, a loudspeaker's Q equals the resonant peak's center frequency divided by the peak's bandwidth. A woofer that "rings" (resonates) over a very narrow frequency band is said to have a higher Q than a woofer that resonates less severely but over a wider band of frequencies. The steeper the resonance, the higher the Q.

The woofer has its own resonant Q, which is modified by the enclosure's Q. These resonances combine and interact to reach the system Q, which usually falls between 0.7 and 1.5. A Q of less than 1 is considered overdamped, while a Q of more than 1 is underdamped. You'll sometimes hear a loudspeaker described as having subjectively "underdamped bass," which means the bass is full and warm but lacks tightness. Technically, these terms refer to the system's anechoic response (the speaker's response in a reflection-free room), specifically whether the response is up or down at the resonant frequency. A "critically damped" system having a Q of 0.5 provides perfect transient response, with no detectable overhang. That is, the woofer stops moving the instant the drive signal stops. The higher the Q, the more the woofer rings.

Subjectively, an underdamped alignment has lots of bass but lacks tightness, has poor pitch definition, and tends to produce "one-note" bass. An overdamped alignment produces a very tight, clean, but decidedly lean bass response. An overdamped loudspeaker has less bass, but that bass is of higher quality than the bass from an underdamped system. Overdamped speakers tend to satisfy intellectually by resolving more detail in the bass, but often lack the bass weight and power that viscerally involve your whole body in the music. Most loudspeaker designers aim for a Q of about 0.7 to reach a compromise between extended bass response (down only 3dB at resonance) and good transient response (very slight overhang). Some designers maintain that a Q of 0.5 is ideal, and that a higher Q produces bass of poorer quality.

Mass-market loudspeakers are virtually always underdamped (high Q) so that the unwary will be impressed by the loudspeaker's big bottom end. An example of absurdly high Q is the "boom truck" that produces a big bass impact but fails to resolve pitch, dynamic nuances, or any semblance of musical detail. That boom you hear is the woofer resonating in its enclosure at a specific frequency—the antithesis of what we want in a high-end loudspeaker. *Excerpted from* The Complete Guide to High-End Audio, Fourth Edition. *Copyright © 2010 by Robert Harley. hifibooks.com*

SPECS & PRICING

Type: Three-way floorstanding dynamic loudspeaker
Loading: Ported
Driver complement: One 13" electro-magnetically driven woofer, two 6.5" midrange drivers, one beryllium inverted-dome tweeter
Frequency response: 22Hz–40kHz +/-3dB
Low-frequency extension: 18Hz (-6dB)
Sensitivity: 94dB (2.83V/1m)
Nominal impedance: 8 ohms
Minimum impedance: 2.8 ohms
Crossover frequencies: 220Hz, 2.2kHz
Recommended amplifier power: 50W–1000W
Dimensions: 21.75" x 32.75" x 61.5"
Weight: 363 lbs each (net)
Price: $90,000

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without excessive brightness, which resulted in a more focused soundstage. The Stella's overall presentation greatly benefits from the exceptionally clean, quick, and detailed tweeter. The upper-midrange and treble had a pristine clarity that was free from the hard and glassy character often heard from dynamic loudspeakers. The tweeter had tremendous delicacy, resolution, and air on one hand, and on the other hand the ability to reproduce high-frequency rich instruments at any volume level with no glare. The top end was infused with a sense of transparent air, space, and open extension. Moreover, the tweeter integrated beautifully with the midrange, providing a seamless transition between the upper-midrange and lower treble. Note that the tweeter crosses over at a very low 2.2kHz, meaning that a substantial part of the audio spectrum is reproduced by the beryllium inverted dome. The midrange was exceptionally smooth, open, and detailed. The mids had a richness and density of tone color that were the antithesis of the "skeletal" or "technical" sound I sometimes hear from some of today's super-high-resolution loudspeakers. This isn't to say that the Stella provided an impressionistic interpretation, but rather that it favored a natural warmth of timbre over a coldly clinical rendering. The fullness and warmth of midrange textures were right at home reproducing Ben Webster's lush, gorgeous tenor tone on the Analogue Productions reissue of *Gentle Ben*, for example. Vocals, such as Patricia Barber on the new LP reissue of *Café Blue*, had an uncanny sense of lifelike presence, but not quite to the same degree as I experienced on vocals at JV's home with the Magico Q5s. This natural warmth of timbre and understated resolving power, in particular, were key to the way the Stella instantly made me relax into the music. The midband was detailed and highly resolved, but that resolution never called attention to itself as resolution. Rather, it was manifested as a subtle richness of inner instrumental detail that, for me at least, made it easier to "suspend disbelief." I find this preferable to being assaulted by detail, even if the price is a very slight (and I mean *very* slight)

dilution of transparency when compared against the state of the art. The Stella's subtle character encouraged me "lean into" the music more, rather than feeling detached by the "technical" nature of the presentation. There's a parallel with guitarists; Yngwie Malmsteen is, technically speaking, a "better" guitarist than, say, Carlos Santana. But I know which one I would rather listen to. The Stella's bass and midbass were of-a-piece with the midrange, with wonderful weight, body, and fullness. This loudspeaker can put out a lot of energy below 200Hz, a quality that gave the music a solid foundation. Acoustic basses and bass guitars were reproduced with a body-involving visceral physicality. The Stella also went very deep, with real extension down to pipe organ territory—I believed the stated –3dB point of 22Hz. Moreover, the Stella can reproduce this subterranean territory with tremendous dynamic authority, no sense of strain, and no port chuffing. The massive bass drum impacts on the spectacular new Reference Recordings LP release of Stravinsky's *The Firebird* and *Song of the Nightingale* were rendered with a combination of deep extension and wide dynamics that only a big loudspeaker can produce. This dynamic authority was matched by speed, precision, and lack of overhang in the midrange and treble. The tweeter is particularly adept at rendering fine transient detail—listen to Joe Morello's fabulous cymbal work on the track "One For Amos" from *Morello Standard Time* recorded by Tom Jung on the DMP label. I could hear every nuance of the attack, shimmer, and decay, with no smearing. The rest of his drum kit was reproduced with a suddenness of attack and freedom from transient blur. Incidentally, this disc contains some great music and is one of the best-sounding recordings of a jazz quartet I've ever heard.

The soundstage was exceptional in every way—width, depth, focus, and the impression of air between images. The ability to reduce the tweeter level and increase toe-in allowed me to get a smooth treble balance and tremendous image focus and delineation. Centrally placed instruments, particularly vocals, had pinpoint precision on some recordings. The Stella's rendering of space varied with the recording; Ben Webster's tenor mentioned earlier was a big, fat, round image that occupied a third of the soundstage, while Michael Brecker's tenor on the disc *XXL* from Gordon Goodwin's Big Phat Band was tightly focused in the soundstage center. The Stella also did "action" well, Jonathan Valin's term for the sense of air expanding around instrumental images in concert with changes in its dynamic envelope.

Finally, I didn't hear from the Stella quite the same absence of "self-noise" as with the Rockport Altair or Magico Q5. This term refers to a loudspeaker's absolute lack of enclosure sound at very low levels. A loudspeaker with low "self-noise" allows you to hear deeper into instrumental and reverberation decay, fostering a heightened sense of realism. It's not a characteristic you hear on every recording; it is most evident to me on solo piano in a hall. You can hear deeper into the decays, and the sound "holds together" and remains coherent down to the very lowest signal levels.

Conclusion

Perhaps the best judgment of an audio product is determined by how quickly and deeply it fosters a state of complete musical immersion. Although I can think of a few loudspeakers that outperform the Stella Utopia EM in certain sonic categories, this new Focal's *gestalt* is one of tremendous musical expressivess and listener involvement. Rather than put on a show of specific sonic attributes, the Stella Utopia EM has an uncanny ability to get out of the way and let the music take centerstage. I don't want to leave the impression that the Stella's musicality is somehow a result of a colored or euphonic presentation. On the contrary, the specific performance attributes—neutral tonal balance, transparency, resolution, lack of grain, driver integration, bass definition, soundstaging, dynamics—were all exemplary. What made the Stella's performance transcend the sum of its parts is, I believe, a very skillful voicing alchemy by a musically sensitive designer.

Living with the Stella Utopia EM daily was such a special experience that I asked to keep the review samples for an extended period as my reference. Despite having access to any number of the world's great loudspeakers, I doubted that whatever came after the Stella would have been nearly as musically rewarding. Recommendations don't come any higher than that. tas

Inside the Focal Loudspeaker Factory

Robert Harley

In late April I traveled to St. Étienne near Lyon in the south of France to tour the factories of loudspeaker manufacturer Focal. Since its founding in 1980 by acoustical engineer Jacques Mahul, Focal has been a driving force in high-end loudspeaker design. The company has developed many core driver technologies, earning thirty patents along the way. Unlike many loudspeaker manufacturers who buy drivers from one supplier and enclosures from another, Focal makes virtually all the components of its loudspeakers from scratch. For most of the company's 31-year existence Focal's primary business was supplying drivers to a *Who's Who* of the world's great high-end loudspeaker brands. Two years after starting its driver-manufacturing business, the company decided to become a developer and manufacturer of complete loudspeaker systems (first launched under the JM Lab name). Focal now makes a wide range of loudspeakers from the $595 Chorus 705V (which I reviewed in Issue 173) to the mighty $180,000 Grande Utopia EM—and seemingly every level in-between.

The Focal factory main building is one of four in the complex.

Upon arriving at the factory, I was surprised by the company's size and the sheer breadth of its products.

Upon arriving at the factory, I was surprised by the company's size and the sheer breadth of its products. The main factory compound—which includes divisions for R&D, driver manufacturing, speaker assembly (the cabinets are made in a separate facility), and testing—spans 110,000 square feet over four buildings and employs about 200 workers. Despite the company's phenomenal growth from its early days as a one-man driver-development laboratory, it was apparent that technical innovation, high quality, and sonic performance remain the company's fundamental ideals. Focal's Managing Director, Gérard Chrétien, is an acoustical engineer, serious music lover (he's on the board that chooses acts for a major annual jazz festival), and a hands-on guy who led the development of the current Utopia line.

Chrétien explained to me the advantages of developing and building drivers on-site rather than relying on outside suppliers. With such an intimate knowledge of how drivers work, and the ability to try innovative design and manufacturing techniques in house, the final product's quality can be higher, he asserted.

I saw this principle in action on the first stop of the tour, the line that produces Focal's patented "W" composite-sandwich drivers found in its upper-end loudspeakers. The composite W driver, developed in 1995 for the first generation Utopia line, is made from a Rohacell core covered by thin skins of resin-impregnated glass tissue. This structure offers high rigidity, low mass, and good self-damping. By varying the thickness of the Rohacell core, and the number and thickness of the glass-tissue layers, the designer can balance the driver's stiffness, mass, and damping for specific applications. Increased numbers of glass tissue layers produces greater stiffness, while thicker Rohacell foam adds more mass and fine-tunes resonance dampening, which is ideal for woofers, for example. Although many of the drivers used in Focal loudspeakers look identical when seen from the front, they actually perform very differently. By designing and building the drivers themselves, Focal can engineer each driver for the

loudspeaker model in which it will be used, rather than use the same drivers in every product throughout a line. Using optimized drivers in a specific loudspeaker also allows the crossovers to be simpler.

The Rohacell arrives at Focal in 6-foot square blocks, and is cut into flat wafers of varying thicknesses with a water jet. I watched as a worker pressed a flat Rohacell wafer into a cone structure under heat. Next, the resin-impregnated glass skin is stretched and smoothed by hand over a conical metal former, then draped and smoothed over the Rohacell core. This composite cone goes into an oven, causing the resin-impregnated glass tissue to fuse to the Rohacell. A laser-cutter trims the outside edge to 0.1mm precision. The heat produced by the laser seals the cone's outer edge. This production line can manufacture 300 cones a day in any one of 33 different configurations.

On one of the tweeter production lines, which can build an astonishing 25,000 tweeters a month, a roll of aluminum-magnesium alloy specially formulated for Focal is cut into squares and the dome structure impressed into the square. The domes are trimmed to a round shape and mounted in a housing that contains a foam compliance. A worker then glues, by hand, the voice coil to the dome. Another worker adds the motor assembly. This is high-precision work—the voice coil must be perfectly centered on the inverted dome, and the tweeter will work correctly only with a precise amount of glue. Focal designed and built the specialized machines that allow the workers to achieve this precision, repeatability, and high throughput. Every driver is individually tested for physical parameters as well as acoustic performance. Specialized software-controlled imaging technology looks at every driver for tiny physical defects invisible to the naked eye. I was amazed by how quickly such precision work was performed, tweeter after tweeter. I shouldn't have been; Focal has been refining the driver-building process for more than 30 years. Moreover, the tweeter-builders are highly experienced, with an average time on the job of nearly 15 years.

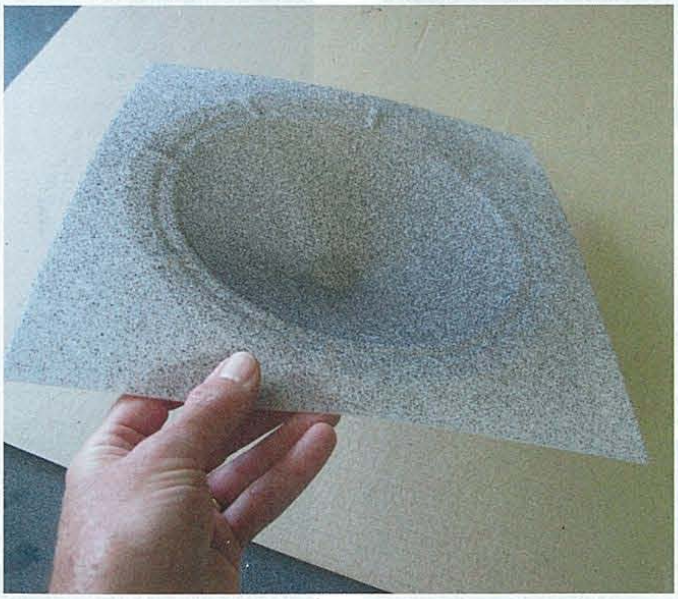
A separate line builds the more advanced tweeters used in Focal's upper-end 900 Profile products. These use a highly compliant rubber-like Poron surround, a more sophisticated magnet structure, but the same dome alloy (magnesium-aluminum).

Yet another tweeter line was dedicated to building the beryllium tweeter found in Focal's Utopia series as well as the Electra Be line. Beryllium is characterized by low mass, mechanical rigidity, self-damping vibration characteristics, and fast heat dissipation. Because beryllium will shatter under pressure at room temperature, the dome must be impressed in the beryllium wafer at a very high temperature. Focal developed and built a machine with a tiny furnace at its core that creates the dome from a flat sheet of beryllium. All the beryllium domes are made by the same worker, who has been with Focal for 25 years. He works in a sealed chamber and wears protective clothing complete with an air-delivery mask. Focal can build as many as 1000 beryllium tweeters per month.

When handed a finished beryllium dome I was astounded by how light it was; I literally couldn't feel it in my hand. The 25-micron-thick dome is one-third the thickness of human hair and weighs just 20 milligrams. For comparison, a playing card weighs 600 milligrams. It's this combination of very low mass, high stiffness, and exceptional self-dampening that makes beryllium such a good material for tweeters. It's also extraordinarily expensive, costing more than 100 times the price of gold by weight. Focal pointed out that although diamond is stiffer than beryllium, diamond has five times the mass—an unacceptable trade-off in its view when building high-frequency diaphragms that must change direction thousands of times a second. As Chrétien explained to me, low mass equals high acceleration; high acceleration equals high-frequency extension and accurate low-level detail reproduction.

I've described just a few of the driver-manufacturing lines I saw in operation; the factory was filled with other lines producing car-audio woofers, along with drivers for professional mixing-studio monitors, among other applications. One line produced 30,000 woofers per month for the car-audio market, with the category representing a third of the company's annual turnover. The warehouse and parts-supply depot were enormous. The factory also assembles

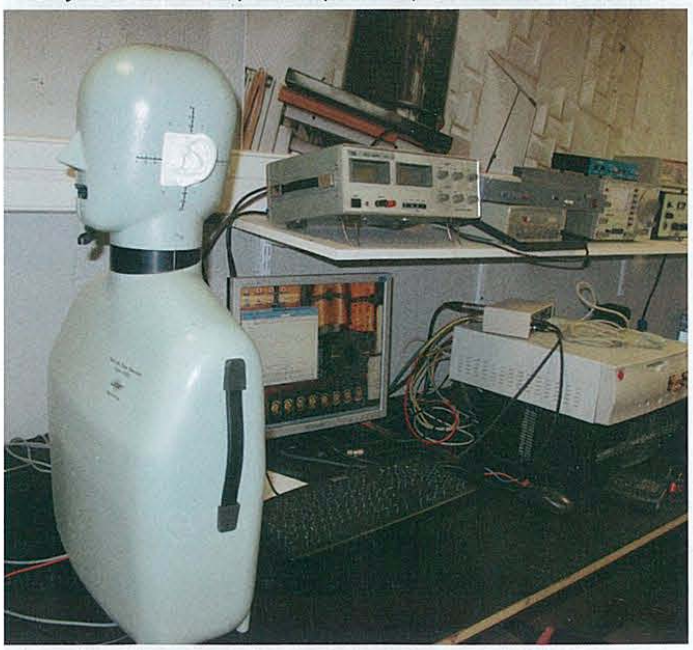
A technician forms flat Rohacell foam wafers (white squares at right) into cones.



The raw Rohacell foam core over which resin-impregnated glass fiber will be applied.

A technician stretches resin-impregnated glass-fiber sheets over the Rohacell core to form Focal's "W" composite-sandwich diaphragms.

Gérard Chrétien, Focal's Managing Director, shows three similar-looking W sandwich midrange cones that actually have very different performance characteristics.



Focal has extensive research and development laboratories in a separate building.

complete loudspeaker systems, including professional and consumer studio monitors, a new market for Focal in which the company has seen explosive growth. A special section of the factory is reserved for building Utopia and Electra loudspeakers, Focal's top-of-the-line home products. I saw a Grande Utopia EM under construction, painted in a custom Lamborghini green for a customer in Asia (who presumably owns a green Lamborghini).

The R&D lab, housed in a separate building, features the largest anechoic chamber in Europe. I'm always interested in the ratio of engineers to sales staff when visiting companies; it gives you an idea of whether the company is engineering-driven or marketing-driven. In Focal's case, R&D was considerably larger than the sales department.

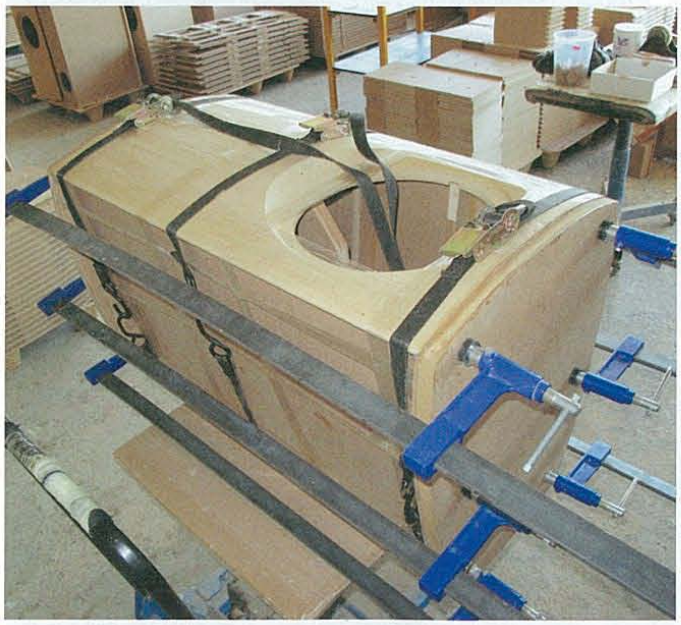
After hearing the Grande Utopia EM and Stella Utopia EM in good rooms, I've come to the conclusion that the Utopia line is world-class reference quality.

The R&D building also housed the reference listening room where I heard eight Focal models ranging from the Chorus 807V ($1095 per pair) to the $180,000 Grande Utopia EM. I also heard the same loudspeaker with Focal's Polyglass drivers (paper coated with hollow glass microspheres) and with W composite-sandwich drivers, so that I could isolate the sonic qualities of the W technology. The playback system included Halcro preamp and power amplifiers fed from a dCS Scarlatti stack. I heard a remarkable step-up in clarity and resolution with the composite W drivers. Similarly, going from a model with a magnesium-aluminum alloy dome to a speaker with the beryllium tweeter rendered a huge increase in performance, specifically the amount of detail, smoothness, soundstage focus, and dynamic ease. I was impressed by what I heard at every price point. The sweet spot in terms of the most performance for the price was the Electra 1028 Be, the least expensive speaker with the W composite-sandwich cones and beryllium tweeter. This $8495 per-pair three-way reflex system features two 6.5" W woofers, one 6" W midrange, and a 1.25" inverted-dome beryllium tweeter. The 1028 Be was a noticeable step up from the Profile 918, and embodied many of the Utopia's qualities.

The loudspeaker I was most eager to hear, however, was Focal's statement product, the $180,000 Grande Utopia EM. I had heard the Grande Utopia EM twice before at the Rocky Mountain Audio Fest where its performance was limited by the room. Although the Grande Utopia had many wonderful qualities at Rocky Mountain, I suspected that it was capable of better performance. That turned out to be the case. At the time of my visit I had lived for eight months with the $97,500 Rockport Altair and $200,000 Sonus faber "The Sonus faber" loudspeakers, and thus came to the Grande Utopia EM with high expectations. Auditioning the Grande Utopia EM for about 40 minutes in Focal's listening room, hearing the previous generation Grande Utopia in the listening room of Micromega's factory, and auditioning the Stella Utopia EM in the showroom of France's premier high-end retailer, Présence Audio Conseil, I came to the conclusion that the Utopia line is of world-class reference

Focal's anechoic chamber is the largest in Europe.

MDF panels awaiting assembly in the Bourbon-Lancy cabinet shop.



A Stella Utopia EM woofer enclosure under construction.

quality. The Grande Utopia EM, in addition to possessing the expected bass extension and wide dynamics of a massive system, exhibited a remarkable delicacy, resolution of inner detail, truth in timbre, and an absolutely stunning impression of instruments existing in space. The Rachmaninoff *Symphonic Dances*, even at 44.1kHz/16-bit (I'm used to hearing the 176.4kHz/24-bit HRx file), was spectacular in every respect.

Focal builds its own enclosures for the Electra and Utopia lines (the Chorus and Profile cabinets are outsourced) in a factory in Bourbon-Lancy, a charming little town that dates back to the 12th century. Although Bourbon-Lancy is a two-and-a-half hour drive from St. Étienne, Focal kept the cabinet production there because of the town's long history of fine woodworking. The cabinet factory was founded by Emile Guy in 1945 to make fine furniture and casework for television sets. It began making loudspeaker cabinets in 1965, and has been continuously producing speaker enclosures for more than 45 years. The cabinet factory was an independent subcontractor to Focal until 2007 when Focal bought the company.

Focal builds its own enclosures for the Electra and Utopia lines in a fine woodworking factory that has been making loudspeaker cabinets for better than 45 years.

The cabinet factory was temporarily shut down on the day I visited so that the work flow could be re-organized for greater efficiency. Nonetheless, I saw the CNC machines, sanders, paint booths, and other equipment that are used to make the cabinets for the Electra and Utopia lines. Again, I was taken back by the operation's size and the number of cabinet panels I saw in-process in the shop. The factory employs about 40 people, the majority of whom have been building speaker cabinets for most of their lives.

Both the driver and cabinet factories are oriented towards high-quality first and through-put second. Every worker has the ability to stop the line and reject a part. The employees are rewarded for a low failure rate in the field, and all have profit sharing. In 2010, every Focal worker received two months salary as a bonus.

The people behind Focal are immensely proud of the fact that the company continues to design and build loudspeaker drivers, cabinets, and complete systems in France. Many loudspeaker companies today have lost touch with manufacturing because of the trend toward outsourcing production to inexpensive overseas subcontractors. They thus become little more than marketing enterprises. Focal stressed to me that its *raison d'être* is innovation and high quality; without these values it could no longer differentiate itself from every other speaker manufacturer. Focal intends to be around for at least another 30 years, and if what I saw and heard is any indicator, its best days are ahead of it. **tas**