

Utopia Beryllium

the Spirit of Sound



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Utopia BerylliumTM

Beryllium to win

Back in September 2002, Focal Home department launched the benchmark Grande Utopia Be, instantly getting worldwide attention. For the first time, pure Beryllium dome technology appeared in a Focal product. Trade publications immediately relayed the event and recognized the Grande Utopia Be quickly as the best loudspeaker in the world, underlining the amazing performance of the state-of-the-art tweeter. Today, December 2004 marks the first introduction of Beryllium in automobile sound systems with the Utopia Be line. More radical, technological and exclusive than ever, the Utopia Be line represents, first of all, an extraordinary human and technological adventure. Our primary goal was to reach sound perfection without restraint or limitation. The pure Beryllium tweeter is the

Utopia Be cornerstone. Its performance is such that we had to completely redesign our woofers and subwoofers in order to optimize their integration. We worked from the source and developed new standard-setting drivers, in the spirit of a non-compromising purist research. That approach comes from our passion for utmost quality and our stubbornness in always pushing the limits in spite of technical obstacles encountered. Our main asset in this endeavour is our total control of the manufacturing process, from concept through the different development stages, in our own facilities. Without this comprehensive mastery of the whole process, our achievements would have simply been impossible to realize. Beryllium sets a new standard in the industry in terms of performance and musicality.

We are convinced that there will be a before and after Utopia Be in the history of high-end sound systems on board of automobiles.

Share your passion at www.focal-fr.com

Bonneville

Guy Bonneville,
Car Division Director



1982 saw the first Focal inverted dome. A daring design based on a relevant analysis on dome's behavior: better mechanical coupling, increased efficiency, better control of directivity, more extended frequency response. Twenty years later, this signature has become the symbol of our technological expertise and of our innovation spirit. Since the original glass fiber type, several generations of inverted dome tweeters have followed one another until we reach their ultimate limit in the titanium technology development with the Tioxid 5 tweeter. So, how to improve on the best from there?

Thanks to pure Beryllium, the inverted dome tweeter has just made a new and possibly its most extraordinary step in its relentless development.

This exceptional material has been well known for a long time as its characteristics reach perfection. Focal has been the first and the only constructor to have introduced the pure Beryllium foil, and this despite all the difficulties to manufacture. The Beryllium cost is about 100 times that of titanium and it is well over the cost of gold. Almost more importantly its very special physical properties make it extremely difficult to work with. To address that daunting challenge and make our dream come true we had to invent a completely new patented manufacturing process.

Beryllium is 7 times stiffer than titanium and aluminum: it is the only metal to scratch glass. It also exhibits high inner damping characteristics, similar to what is encountered in a silk dome. That com-

bined with its extreme lightness makes it a dream material for tweeter dome.

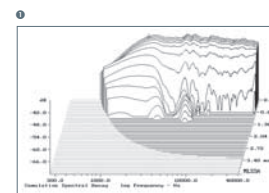
These great properties assembled in a single material result in a frequency range covering 5 octaves, from 1.2kHz to 40kHz, thus making any additional "super tweeter" a thing of the past.

The use of a single drive unit to transcribe the upper frequencies range is allowed by a nearly perfect impulse and an unconditional respect of the phase. That in turn conduces to a degree of coherency never obtained by any other technology until now.

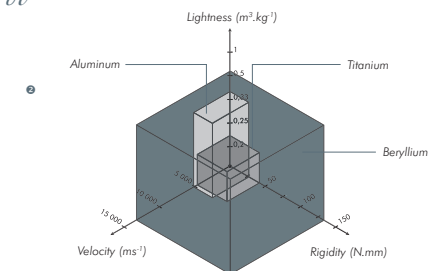
After your first listening of a pure TBe Beryllium tweeter, there won't be no going back to anything else. Its transparency, its definition, its softness and its energy are so ahead of all you have been listening to until now that it is addictive.

Beryllium TechnologyTM

When only the best will do



① Waterfall response: linearity from 1.2kHz to 40kHz, fast acoustical decay without resonance characterize the highly efficient Beryllium tweeter.



② Comparison of Beryllium with Titanium and Aluminum. Beryllium is the lightest, stiffest and has the highest velocity of sound.

TBe tweeter™

Over the limit

Coming from the Grande Utopia Be speaker, the tweeter with pure Beryllium inverted dome has been completely re-designed for the specific automobile environment.

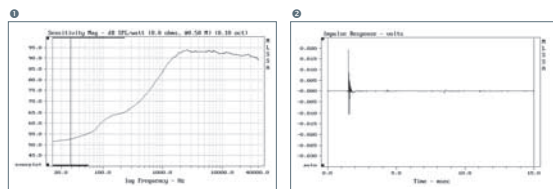
A new optimization of the magnetic motor, after several simulations, measures and listening sessions, has allowed to considerably reduce the overall size of the Neodymium magnet assembly. We now use the most powerful version of this material and the most capable at handling heat without losing its magnetic force.

A tweeter can reach a very high temperature in a short period of time, at which point demagnetization might occur of the standard grade Neodymium magnet. Thanks to the use of a 6 Ohm aluminum former voice coil, as well as a powerful motor and the exceptional light weight of

the Beryllium dome, this tweeter needs little electrical energy to produce a high sound level, meaning less current is needed and less heat is created. We went clearly as far as possible to stay on the safe side of the overall equation.

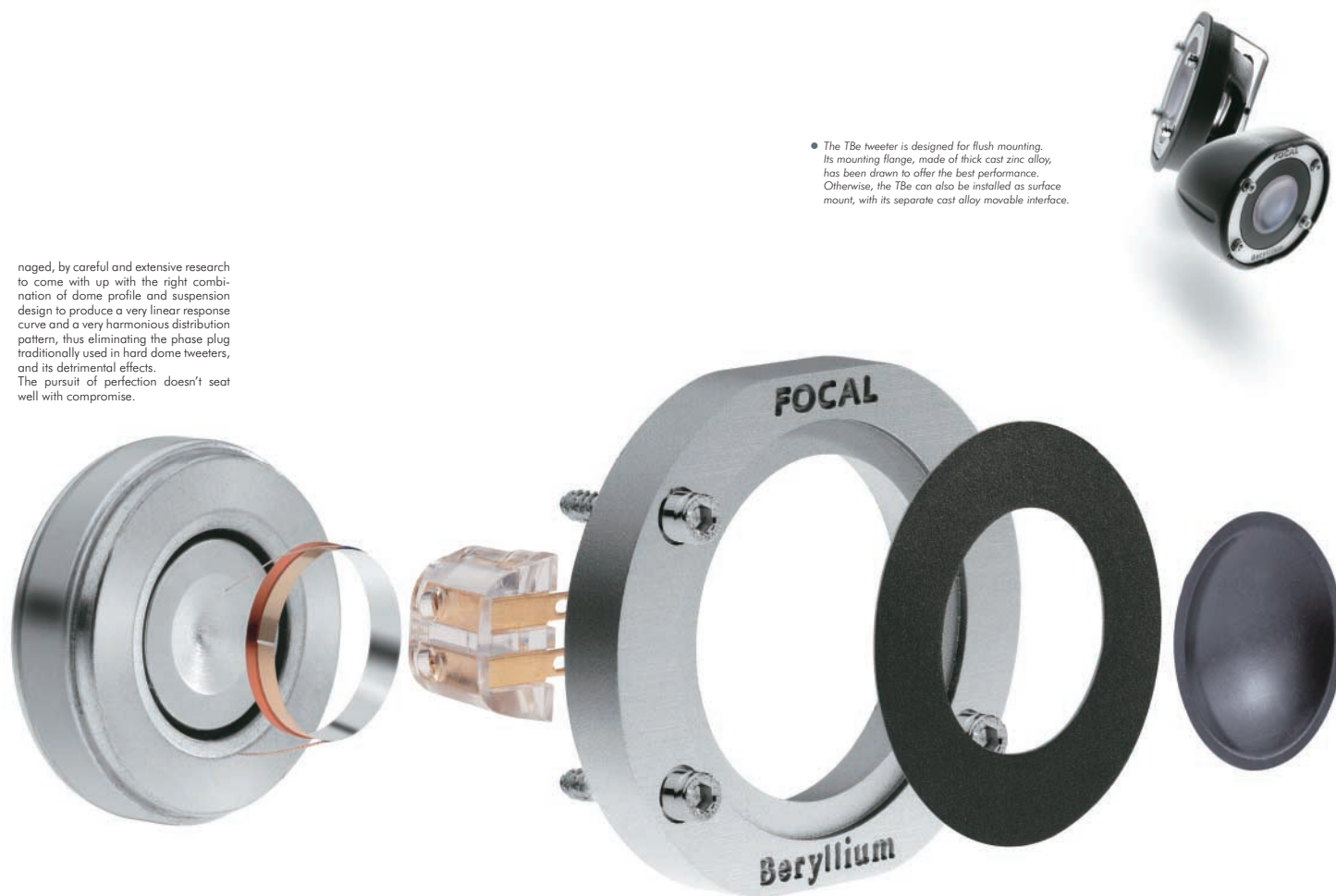
That was yet not good enough. Thanks to the right alignment of the tweeter parameters, we have succeeded in getting an ideal, natural acoustical damping, without resorting to the use of Ferrofluid in the gap, thus further reducing distortion and increasing definition. It is the approach you will find throughout the whole Utopia Be line: to find or to invent the right solutions from the start, and consequently to avoid the recourse to technical tricks and fixes, which only result in poorer sound quality. The lack of phase plug on the tweeter is a clear example of our thought process: we ma-

naged, by careful and extensive research to come with up with the right combination of dome profile and suspension design to produce a very linear response curve and a very harmonious distribution pattern, thus eliminating the phase plug traditionally used in hard dome tweeters, and its detrimental effects. The pursuit of perfection doesn't seat well with compromise.



❶ The frequency response covers the huge range of 5 octaves from 1.2kHz to 40kHz. This incredible performance allows to do away with any need for a "super-tweeter".

❷ The impulse response shows clearly the outstanding characteristics of the Utopia Beryllium tweeter: fast response, short well controlled acoustic decay. In itself this demonstrates the qualities of stiffness, lightness and acoustic damping of the Focal Beryllium dome, unmatched by any other dome.



• The TBe tweeter is designed for flush mounting. Its mounting flange, made of thick cast zinc alloy, has been drawn to offer the best performance. Otherwise, the TBe can also be installed as surface mount, with its separate cast alloy movable interface.

• Structure of the Utopia Beryllium tweeter.

"W" cone™

The "W" cone has been a well known innovation, yet we have managed to improve it further

The manufacturing of composite sandwich cones has been a Focal tradition for nearly 20 years now. It kept on going over generations of improvements, the latest and most impressive being the «W» composite structure used on the Utopia range. This leading innovation has had some considerable impact in sound quality car audio competition where it helped establish Focal as the most highly respected contender.

At the core of the «W» sandwich is a foam structure whose mechanical properties are exceptional, and a well guarded secret. Both sides of that core are laminated with a thin sheet of glass fabric. The bonding of the outer layers to the core is obtained by full polymerization. This is what gives the «W» membrane all its integrity and its incredible stiffness: about 20 times that of other competitive membranes at equal mass, while still offering unmatched acoustical damping.

The unique concept and manufacturing of our Focal cones is where Focal superior sound comes from. Where most other manufacturers place various importance respectively to damping, weight and stiffness, the essential and determining characteristics of any cone or membrane, Focal managed to pay equal and undivided attention to all three at the same time, making for a truly superior technology, immediately transcribed into truly superior and more refined sound.

At the occasion of creating the cones for the drive units of the new Utopia Be line of products, Focal took the «W» cone one step above. To the point of becoming an art, in many ways comparable to the fine art of wine making. By varying the thickness and the density of the foam core, by adding or removing some layers of glass fabric on the each side of the core, we have succeeded in controlling step

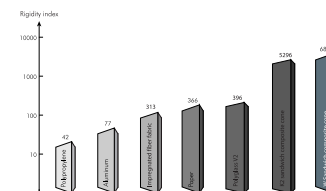
by step these 3 factors independently of each other, in order to fully master the final characteristics of the resulting cone.

We will for instance privilege stiffness for a subwoofer cone, while we will privilege acoustical damping and light weight for a midrange cone.

Focal's cone technology allows a unique flexibility in the design and in the making of each cone in order to obtain for each speaker a frequency response as linear as possible, a well controlled and natural sounding cut off and an harmonious directivity pattern. As a direct result it is now non necessary to include any kind of correction in the crossover and it will allow the full exploitation of the revolutionary Crossblock concept.



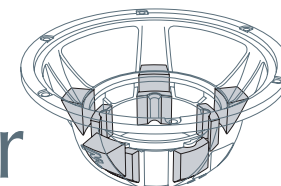
- The "W" composite sandwich, hand-made, gets its name from the double V of "Verre-Verre" (verre means glass in French), as we use glass on both sides of the high-tech foam core.



- At equal mass and diameter, the rigidity factor of the "W" cone woofer outpaces all other materials used in speaker cones.



● The legs of the frame are filled with high viscosity rubber, which absorbs all the vibrations in the chassis.



Utopia Be Woofer

Better, louder, greater

The extraordinary performance of the new "W" cone challenged us to come up with suitable technologies to match, for a no compromise result.

A brand new frame was designed for the brand new Utopia Be. It is made of a special aluminum alloy providing strength as well as optimal heat transfer where necessary and good vibration damping. It is finished with finely textured black power coating, for a distinguished aesthetics suiting its performance. The high pressure injection process allowed intricate sculpturing and details.

One of the purposes of this new reference line of products was to allow exceptional quality installations, even in the most difficult, intricate and tight areas, which are often found in luxury and high performance automobiles.

This was clearly calling for a compact magnetic motor, while at the same time

we had to come up with high magnet strength for the performance we were looking for. This is how we ended up designing a brand new powerful ring magnet made of neodymium, material which provides 10 times the energy found in ferrite. To extract the utmost quality of this superb material, we went through the trouble of many Finite Element Analysis based iterations of designs. This is how we determined the right shape of the motor in order to obtain a perfectly symmetrical distribution of magnetic energy in the air gap for optimized control of the motion of the voice coil, from small to large displacements. We literally shaped the magnetic filed in which the voice coil is immersed at all frequencies for most constant force factor.

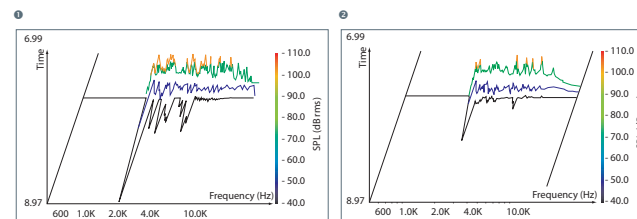
The result is a level of control of the voice coil rarely encountered, insuring

extremely low distortion even under the highest stress of hard driving.

The woofers of the Utopia Be line have all been designed and engineered with a particular concern for one all too often neglected quality: consistency of tonal character at all levels, from low to high. This means that your system sounds the same, has the same balance, the same sound whether you play soft or loud as all the parameters stay stable under small and large excursions. Rare care for rare quality.

The woofers of the Utopia Be line have also been designed so that they work with a perfect mechanical stability over their entire frequency range.

To play beautifully, very loud or very soft, for very long time, this is what these woofers are for.



- Reaction of the chassis on an impulse: without any rubber, an important quantity of energy is left spread into the frame with a long decay.
- With damping the energy left is of less amplitude (notably in the critical mid-range and treble frequencies) and immediately absorbed.

● The massive polished alloy circular ring, made by high pressure injection, reinforces the frame's rigidity and provides also a solid mounting base for the acoustic grille.

● The surround has been developed to offer a very effective control of the cone's displacement, and to maintain specific driver's parameters through several years of intensive use.

● The very high quality spider is made to work for years without any loss of performance. It integrates the electrical connection to the voice coil, doing away with the usual lead wires, thus eliminating the mechanical noise at high power.

● The frame is specially designed to help cooling down the heat generated by the voice coil of the drive unit, further reducing thermal compression.

● The high power neodymium magnet is completely integrated into the frame itself so the heat generated in and around the magnet is directly and efficiently evacuated through the frame itself which acts as a heat exchanger between the motor and the surrounding environment.

● The voice-coil transmits a considerable force to the cone. This force is constantly applied over a long excursion, thanks to the length of the voice coil winding.

● Special attention to details: the gold plated terminals fully encapsulated in specially designed clear polycarbonate blocks inset into the woofer's frame to further guarantee reliable contacts over time.

● The ring magnet design has been optimized using highly sophisticated Finite Element Analysis so that it keeps full magnetization up to very high temperatures (120 deg. Celsius).

● This driver is indeed so close to ideal that we were able to trade the phaseplug that is usually required to improve the off axis response in the higher frequencies for a large aluminum focus cap.

● The "W" composite sandwich cone in its ultimate version, still improved in order to combine and to fine tune all the characteristics needed for the specific functions of this

● The frame is widely open in the back to offer minimum resistance to the high displacements of the cone, further eliminating mechanical compression and distortion.



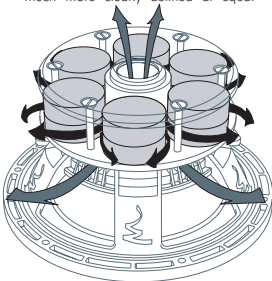
Multiferrite™

Real magnet for real bass

The Multiferrite technology has been another essential element of the Focal offering for 20 years and counting. The story of this magnet technology is worth telling. At the time Focal decided to develop its first very high efficiency woofer, the unusually large ferrite this was calling for simply was not available, so an alternative solution had to be found to produce the desired magnetic energy for that new motor. The chosen solution was to use an array of several double stacked ferrite rings, on a circular open pattern regularly distributed around the voice coil. The Multiferrite was born. 20 years later, we still use the same design born out of necessity. Indeed more than one advantage came from that original design. Not only the magnetic

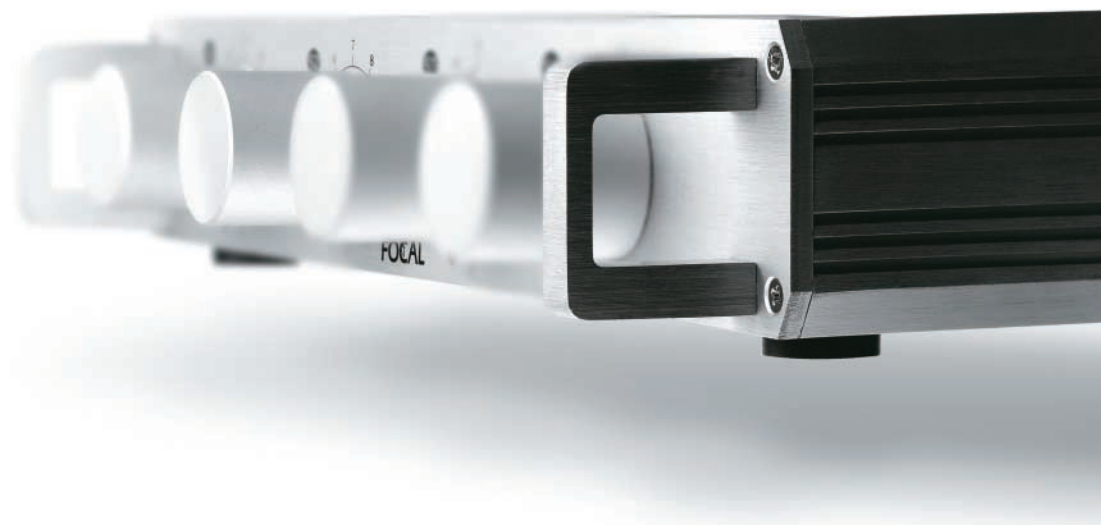
energy is considerable, but a greatly welcomed cooling effect comes from the free circulation of warm air in the open space in between the magnet stacks, providing direct thermal ventilation right on the outside of the coil. In fact the harder the woofer works, the more air is forced through these open vents, and the more effective the cooling of the voice coil. The direct benefit of that exceptional cooling of the voice coil is that the voice coil itself can take more amps from your amplifier, both continuously and on impulse. This will translate into lower thermal compression, lower distortion, and higher dynamics. In terms of sound, the bass will be louder and much more clearly defined at equal

power. The woofer will give the feeling to work at ease under high stress. Bass is big, deep, powerful on impact, and you can distinctly follow a bass line. Even at lower sound pressure the whole bass spectrum is fully reproduced and present. Another advantage of this technology is the considerable reduction of all the mechanical compression: as the back of the driver and the whole moving assembly are largely open there is no trapped air and no slowing down, so the cone moves much more freely back and forth, thus further enhancing the sense of impact and dynamics for a more natural.



- Our Multiferrite motor layout allows an exceptional ventilation of the voice coil. In turn it will be capable to handle more power from the amplifier without any dynamic compression, meaning a Multiferrite woofer will play substantially louder as you feed more current.





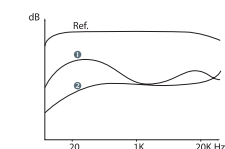
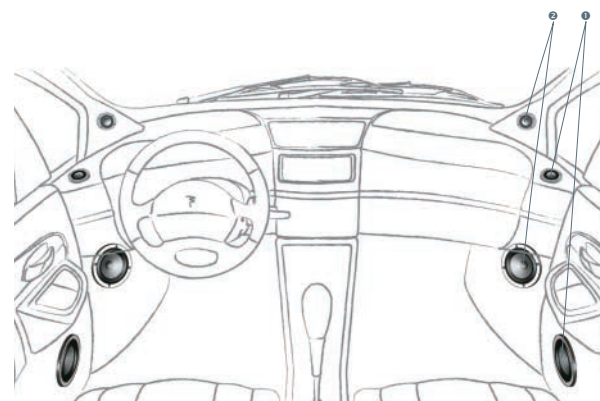
Crossblock™

From our laboratory to your automobile

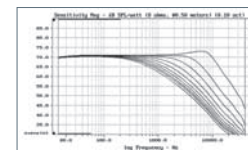
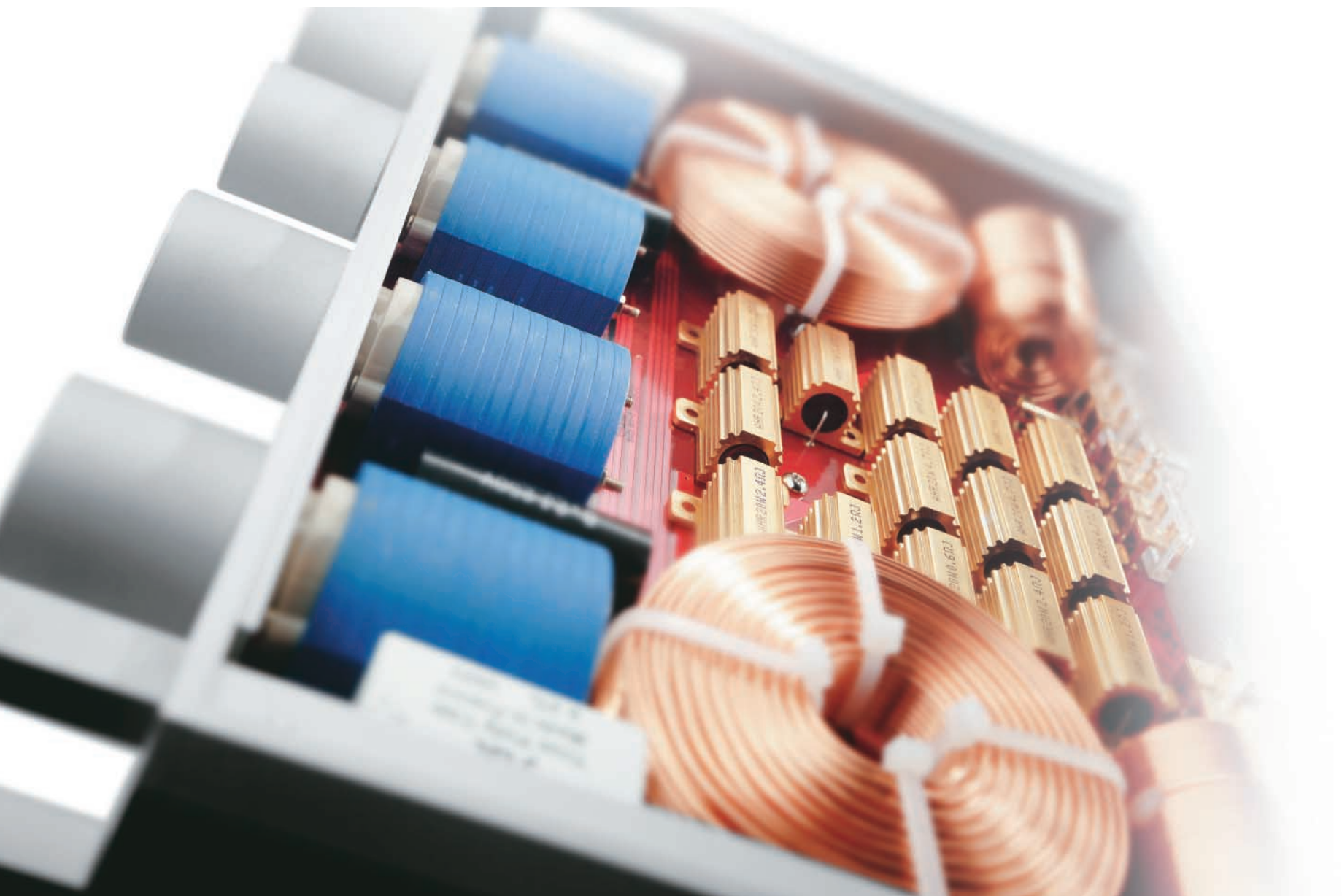
The developing of a loudspeakers line is all too often happening in closed loop in laboratory. Consequently the performance of such speakers is raised in absolute term and they will perform best on a store display. Only to sound so very disappointingly once installed in a car. We kept in our mind all along that the final destination of our Utopia Be line is your car. We have realized that the best loudspeakers in the world won't give all of their performance if they don't integrate the acoustic constraints of their environment, in this case your car. In a car the acoustic is complex and unpredictable. There are so many variable: size, proportions, materials used in the car, sound deadening used on the metal parts of the chassis, not to mention the location and the installation of

the loudspeakers. This creates an infinity of parameters of which the combined result is impossible to simulate. It is to respond to that situation that we came up with the Crossblock. This is no less than 4480 possible combinations of filtering at your fingertips, all in one compact box, thanks to the use of specific components, specifically developed for Utopia Be. After installation, your retailer will be able to propose an adjustment adapted to your specific situation, to your car as it is, thus entitling you to get the most impressive performance out of your investment, exactly the same this time as what we have designed for you in these products. Once in place it is all yours to explore all the possibilities of fine adjustment. Now, you can even create

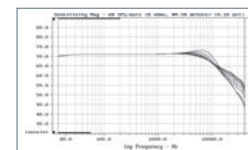
your own sound in your own car. This is not so far from what is happening in a recording studio, with the driver in the mixer seat. The excellence of the loudspeakers Utopia Be, their exceptional linearity, their characteristics of directivity and neutrality, have helped to reduce the essential adjustment to four, to adapt ideally the loudspeakers Utopia Be to your car. The Utopia Be loudspeakers characteristics being so close to ideal; there is no need for correcting the eventual imperfections of a speaker with compensating networks. This is what is allowing the simple and elegant solution of the Crossblock. Despite the power of the 4480 combinations of fine-tuning it offers, it is deceptively simple to use.



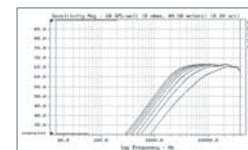
- The possible locations for loudspeakers are numerous: top or the bottom of the doors, dashboard, kick panel, roof front pillars. Every location has an important impact on the sound of any loudspeaker in your car, and on its frequency response and the perception of the 3D sonic image.



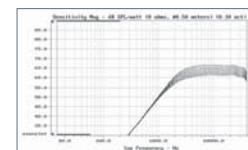
● S1 adjustment



● S2 adjustment



● S3 adjustment



● S4 adjustment

- The Crossblock: 4 adjustments, which will influence the behaviour in the bass, the mid-range, and the treble, which give a choice of 4480 combinations of fine-tuning.

Crossblock™

Using the best of what there is, and going further

Our Crossblock is not an equalizer. It is not a corrector either: our loudspeakers don't need any! It is a fantastic tool, which helps to precisely adapt the crossover to the acoustical characteristics of the car in order to integrate its acoustics into the whole sound system, the source, the amplifiers and above all, the loudspeakers. Without this thought process, there would be no hope of truthful music reproduction. But the making of a perfect crossover, versatile and efficient brought up an expected obstacle: multiplying the adjustment possibilities, therefore the number of components would have called for over a hundreds of parts,

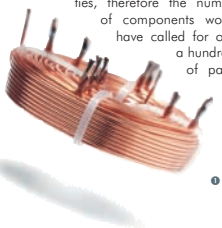
something unrealistic, considering the size limits of the crossover itself. The only way would have been to use small size components, which would have been detrimental to efficiency.

Once more necessity was mother of invention. Instead of using more than 10 coils we designed a single Multicoil air core inductor which is in essence, thanks to multiple connection points within the winding, 10 coils wound at once into one. This allowed us to use a very large gauge copper wire, which guarantees a very low insertion loss. The same way, instead of using a multitude of capacitors, we designed a Multicap capacitor, which is nothing else but a number of different values capacitors wound together as one. These Multicaps are indeed high efficiency metallized polypropylene capacitors made with the strictest specifications by SCR. We also use high quality switches with very low insertion loss, and we even went as far as wiring in parallel some of the

terminals of the switch to further lower the series resistance down to less than a thousandth of an Ohm.

To go with the extraordinary performance of the drive units used on these systems, we couldn't accept any compromise, so nothing could deprive you of the most refined tuning system ever designed for your car.

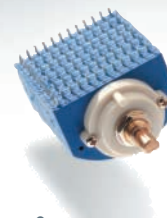
We are giving you the unique opportunity in just a few clicks, to almost infinitely refine and enrich the sound in your car, while discovering the essence of the Utopia Be sound.



1



2



3



1 The Multicoil is a series of many different inductors all wound in one, thus offering a large variety of inductance values for fine tuning of the crossover. It is also a very compact device with extremely low insertion loss which could not have been achieved using many inductors in place of the Multicoil.

2 Capacitors Multicap of SCR with polypropylene film. Combining the know-how of SCR in the field of audiophile capacitor and the Focal expertise in filtering, the Multicap offers a large palette of values in a single element.

3 The switches used on the Crossblock are there to associate various inductance values, capacitance values and resistance values in order to offer no less than 4480 combinations of filters. Because these switches are at the heart of the Crossblock concept we selected them for their very low insertion loss, further reduced by parallel wiring.

N°.5

Elegance in high technology: live a unique experience

Our N°5 two-way system is based on a 5" (130mm) midrange woofer, the 5 W2 Be. It is reproducing a large bandwidth from mid to low frequencies in order to merge easily with a subwoofer, its "W" cone, both light and well damped, allowing to reach down to 80Hz with a perfectly balanced response. This woofer appears to be the downright complement to the Beryllium tweeter on account of the richness and extraordinary definition of the mid frequencies.

Its on axis frequency response and its energy response across the whole spectrum are ideally harmonized and result in an overall low directivity pattern. Its compact design makes it extremely well suited for easy installations just about anywhere in most vehicles, including doors and kick panels, while providing exceptional stereophonic imaging. Wherever you choose to install it, the N°5 system state-of-the-art performance will be magically enhanced by the Crossblock crossover, which thoroughly insures a complete adaptation of the loudspeakers to their acoustical environment in the hands of a fine installer.

Considering the simplicity of integration and the exceptional Utopia Be sound, system N°5 is the perfect solution for a compact 2-way installation complemented by a separate subwoofer.



The 5 W2 Be woofer in its different states, by itself ❶, with its alloy ring ❷ and with acoustic grille ❸.



Type	2-way, 5" (13cm) "W" woofer, 1" (2.5cm) Beryllium tweeter
Frequency response (+/- 3dB)	75Hz - 40kHz
Nominal power handling	75W
Sensitivity (2.83V / 1m)	89.5dB
Nominal impedance	4 ohms
Voice-coil diameter	1 1/4" (32mm)
Voice-coil height	1/2" (13mm)
Xmax	1/8" (3.5mm)

*This system is also available as N°5 Active version (without Crossblock filter).



N°.6

The right balance

The heart of our N°6 kit is a 6.5" (165mm) midrange woofer which embodies the cornerstone of the Utopia Be line in this all classic configuration, the 6.5" (165mm) 2-way. For our ambition is to establish the highest degree of realism, the 6 W2 Be is able to deliver utmost performance at both mid and low frequencies, even without a subwoofer and in very large vehicles. The 1.5" (40mm) diameter and .6" (15mm) height voice coil gives to the 6 W2 Be undeniable strength and substantial power handling while allowing impressive bass excursion. Its parameters have been carefully set in order to obtain optimal load when working in typical door panel configuration, in .5cft (15 liters) to 1cft (30 liters) volumes.

Here again, thanks to the very efficient design of the frame itself and to the use of a shallow neodymium magnet the 6 W2 Be will mount where other 6.5" (165mm) units could not fit. Powerful, exhibiting tremendous authority in low frequencies, the 6 W2 Be bears all the attributes to play back all styles of music, from the most subtle to the loudest, without any dynamic limitation. The 6 W2 Be and the pure Beryllium inverted dome tweeter combination, merging through the Crossblock, produce a perfectly balanced N°6 system with unequalled sound richness and accuracy.

Type	2-way, 6-1/2" (16.5cm) "W"woofer, 1" (2.5cm) Beryllium tweeter
Frequency response (+/- 3dB)	66Hz - 40kHz
Nominal power handling	100W
Sensitivity (2.83V / 1m)	91.5dB
Nominal impedance	4 ohms
Voice-coil diameter	1 1/2" (40mm)
Voice-coil height	5/8" (15mm)
Xmax	3/16" (4.5mm)

**This system is also available as N°6 Active version (without Crossblock filter).*



● Stainless steel mounting screw.

N°.7

The experts formula



- All the Utopia Be systems are delivered in luxury aluminum carrying case.

The concept behind the system N°7 lies in a simple fact: in some cases, in some vehicles, and due to improper loudspeakers location, the classic 2-way configuration often ends up altering the sonic imaging perception.

The System N°7 offers a 100% acoustical solution in order to obtain perfect staging and a realistic sound imaging in the most challenging circumstances.

We developed a real midrange driver, the ultra-compact 3 W2 Be. Only 3" (80mm) diameter and 3.15" (35mm) depth, the 3 W2 Be is intended to be installed on the dashboard close to the Beryllium tweeter. Numerous listening sessions told us that this midrange driver needs to function well below 200Hz in order to cover the range of directional sounds and to provide

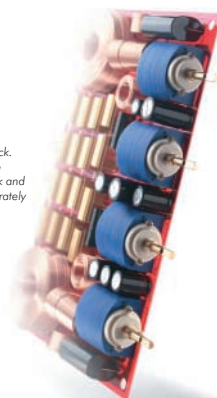
seamless blending with the 6 W3 Be 6.5" (165mm) woofers installed in the doors, for it is imperious that all sounds must originate from the dashboard area to render a truly accurate and stable sonic image.

The 3 W2 Be midrange driver can also be used in Kick Panel.

Built like the Utopia Be line woofers, with a specific W cone for good damping, the 3 W2 Be retains the same injected compact alloy basket. It is equipped with a 1" (25mm) diameter and .3" (8mm) height Neodymium magnet, to insure a solid reproduction of low midrange without distortion. That concept, similar to our woofers, brings exceptional response down to 180Hz in a limited space of only 0.018 cft (0.5 liters) . Here the 3 W2 Be

shows its superiority over other types of midrange drivers, such as flexible dome midranges which do not effectively match its low end response and its high energy and fantastic dynamics.

The 6 W3 Be woofer is specifically calculated for that system in order to deliver optimal bass performance and, has been specially designed to deliver its optimum performance in vehicle doors.



- The N°7 kit features its own specially engineered Crossblock. Functionalities and settings are different from other Crossblock and aim, for the most part, to accurately optimize the midrange/woofer blending.

Type	3-way, 6-1/2" (16.5cm) "W" woofer, 3" (8cm) "W" midrange, 1" (2.5cm) Beryllium tweeter
Frequency response (+/- 3dB)	55Hz - 40kHz
Nominal power handling	100W
Sensitivity (2.83V / 1m)	89dB
Nominal impedance	4 ohms
Voice-coil diameter	1 1/2" (40mm) et 1" (25mm)
Voice-coil height	7/8" (17mm) et 5/16" (8mm)
Xmax	1/4" (5.5mm)

*This system is also available as N°7 Active version (without Crossblock filter).



13 WS

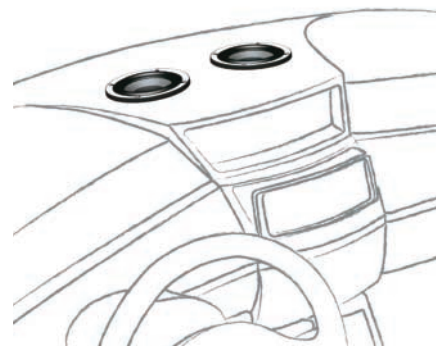
Condensed bass for better performance



The Utopia Be kits N°5, N°6 and N°7 will be the essential components of your system. We thought about pushing the envelope and finding cutting edge solutions to further increase the overall performance of your system. Hence, Focal is the first manufacturer to establish the concept of the 5" (13cm) compact subwoofer to be placed in the front of the vehicle in order to reproduce superior quality bass in the 50 to 100Hz range. Considering that it is very difficult for a 2-way system to get optimal alignment at these frequencies where distortion and sound coloration usually occur, the idea is to create a true bass loudspeaker, perfectly controlled by the appropriate limited space load and compact enough to be installed in the front of a vehicle embedded in the doors or dashboard.

The 13 WS represents the ultimate development with increased ease of integration thanks to its new basket and to the powerful Neodymium magnet. A .25cft (7 liters) sealed box is large enough to go down to 67Hz (+/-3dB). Thanks to its compact design and to the small volume it requires it will now be possible to bank several 13 WS together in the front of the vehicle to multiply acoustical power. Besides true performance improvement, this concept also brings now bass to the front of the vehicle, where the other drivers are located, so that all sounds can be perceived simultaneously, from the same perspective and without delay or phase alteration. To the contrary of what's commonly accepted, low frequencies above 80Hz are directional. A subwoofer placed in a trunk would

cause significant discomfort with bass coming from the back and altering the sonic image. Some electronic equipment, through appropriate digital processing, allows to partially compensate for this type of phase shift, however, they cannot do anything to prevent some frequencies to be perceived from the back of the vehicle. Our solution, 100% acoustical and intuitively more natural, is the right answer in order to reach a state-of-the-art realistic sound reproduction. Progress achieved in consistency and linearity will be as valued as the listening comfort provided.



● A .25cft (7 liters) sealed box is enough to go down to 67Hz (+/-3dB). Therefore, and thanks to its compactness, it will be more easily installed in the front of the vehicle, embedded in the doors or dashboard.

Type	5" (13cm) "W" subwoofer
Frequency response (+/- 3dB)	36Hz
Nominal / Peak power handling	75W / 150W
Sensitivity (2.83V / 1m)	88dB
Nominal impedance	4 ohms
Voice-coil diameter	1 1/4" (32mm)
Voice-coil height	7/8" (22mm)
Xmax	5/16" (8mm)
Free-air resonance (Fs)	53.43Hz
Compliance volume (VAS)	5.25 liters
Total Q (Qts)	0.495
Electrical Q (Qes)	0.52
Mechanical Q (Qms)	10.09
Voice-coil DC resistance (Re)	3.09 ohms
Driver area (Sd)	86.6 sq cm

- The 21 WX dynamic behavior is simply astonishing and perpetuates the standards achieved in sound definition, transparency and fidelity by the Utopia Be line.



21 WX

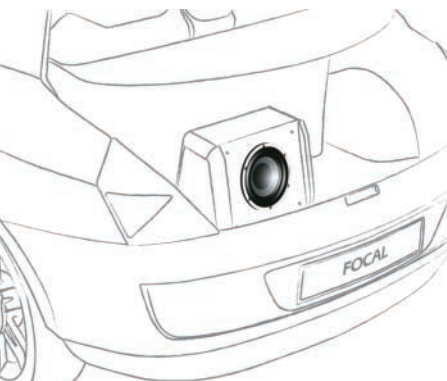
Bass for Beryllium

It was clear to us that we had to come up with an outstanding subwoofer to be associated with the three Utopia Be systems. This meant that we had to create a bass driver equal in terms of quality to the standard we reached with the pure Beryllium dome tweeter. That kind of challenge leaves no place to casual approach and demands finding innovating solutions. Maximum SPL power was not the primary goal, so our quest focused on the purest fidelity. This is why we decided not to rely on a large diameter subwoofer, but to work on a 8" (21cm) W cone, which offers the great advantage to be much lighter. The ratio between the tremendous power of the

Multiferrite magnet and the moving mass is optimal, allowing the bass to be much more dynamic, and perfectly controlled. The crossover between 21 WX and the N°5, N°6 and N°7 systems provides unmatched performance. The 21 WX can also be used to assist one or several 13 WS, especially below 60Hz where true low frequencies are omni directional. The other advantage of a smaller diameter cone is its ability to be mounted in confined space. The 21 WX works in a sealed box of 0,5cft (15 liters), where it will reproduce pure and efficient bass. It will reach its optimal linearity in a 1cft (30 liters) volume.

What is amazing about the 21 WX subwoofer is that it sustains comparison with much bigger diameter drivers thanks to its exceptional power handling. Correctly tuned in a 1cft (30 liters) bass-reflex enclosure, it will reach notes below 30Hz with commanding energy and it will make you seriously doubt its size...

Type	8" (21cm) "W" subwoofer
Frequency response (+/- 3dB)	29Hz
Nominal / Peak power handling	250W / 500W
Sensitivity (2.83V / 1m)	86.5dB
Nominal impedance	4 ohms
Voice-coil diameter	2" (50mm)
Voice-coil height	1" (25mm)
Xmax	1/3" (8.5mm)
Free-air resonance (Fs)	36.63Hz
Compliance volume (VAS)	18.8 liters
Total Q (Qts)	0.6
Electrical Q (Qes)	0.77
Mechanical Q (Qms)	2.81
Voice-coil DC resistance (Re)	3.4 ohms
Driver area (Sd)	208.7 sq cm



- The 2" (50mm) diameter and 1" (25mm) height coil allows a 500 watts peak power input. Although maximum SPL level research was not a priority that subwoofer also presents, from that perspective, absolute first class SPL performance.

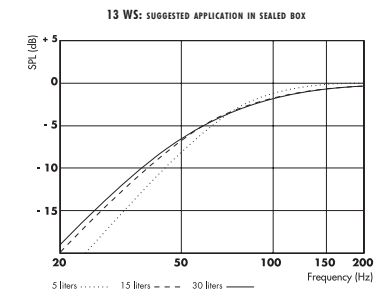


Subwoofers Parameters

Utopia Beryllium
the Spirit of Sound



SPECIFICATIONS	13 WS	21 WX
Nominal power	75W	250W
Maximal power	150W	500W
Sensitivity (2.83V / 1m)	87.8dB	86.5dB
Cone	"W"	"W"
Surround	Butyl	Butyl
Nominal impedance	4 ohms	4 ohms
DC resistance	3.09 ohms	3.4 ohms
Voice-coil diameter	32mm (1-1/4")	50mm (2")
Voice-coil height	22mm (7/8")	25mm (1")
Voice-coil former	Kapton™	Aluminum
Layers	2	2
Wire	Copper	Copper
Inductance	1.05mH	1.13mH
Xmax	8mm (5/16")	8.5mm (1/3")
Magnet	Neodyme	Multiferrirete
Flux density	0.7T	0.85T
Gap height	6mm (1/4")	8mm (5/16")
Net weight	0.7kg (2.2lbs)	4kg (8.8lbs)



THIELE & SMALL PARAMETERS	13 WS	21 WX
Fs	53.43Hz	36.63Hz
Vas	5.24 liters	18.80 liters
Qts	0.495	0.604
Qes	0.52	0.77
Qms	10.09	2.81
Re	3.09 ohms	3.4 ohms
Sd	86.59 cm²	208.67 cm²
Cas	3.73 E ⁻⁰⁸ m²/N	1.34 E ⁻⁰⁷ m²/N
Mas	237.93kg/m⁴	141.01kg/m⁴
Ras	7916.47 ohms.ac	11549.11 ohms.ac
Cms	4.97 E ⁻⁰⁴ m/N	3.07 E ⁻⁰⁴ m/N
Mms	17.84g	61.4g
Rms	0.594kg/s	5.029kg/s
Ces	501.28mF	984mF
Les	17.7mH	19.19mH
Res	59.96 ohms	12.41 ohms
Bl	5.97N/A	7.9N/A
SPL	83.7dB/W/m	82.6dB/W/m

