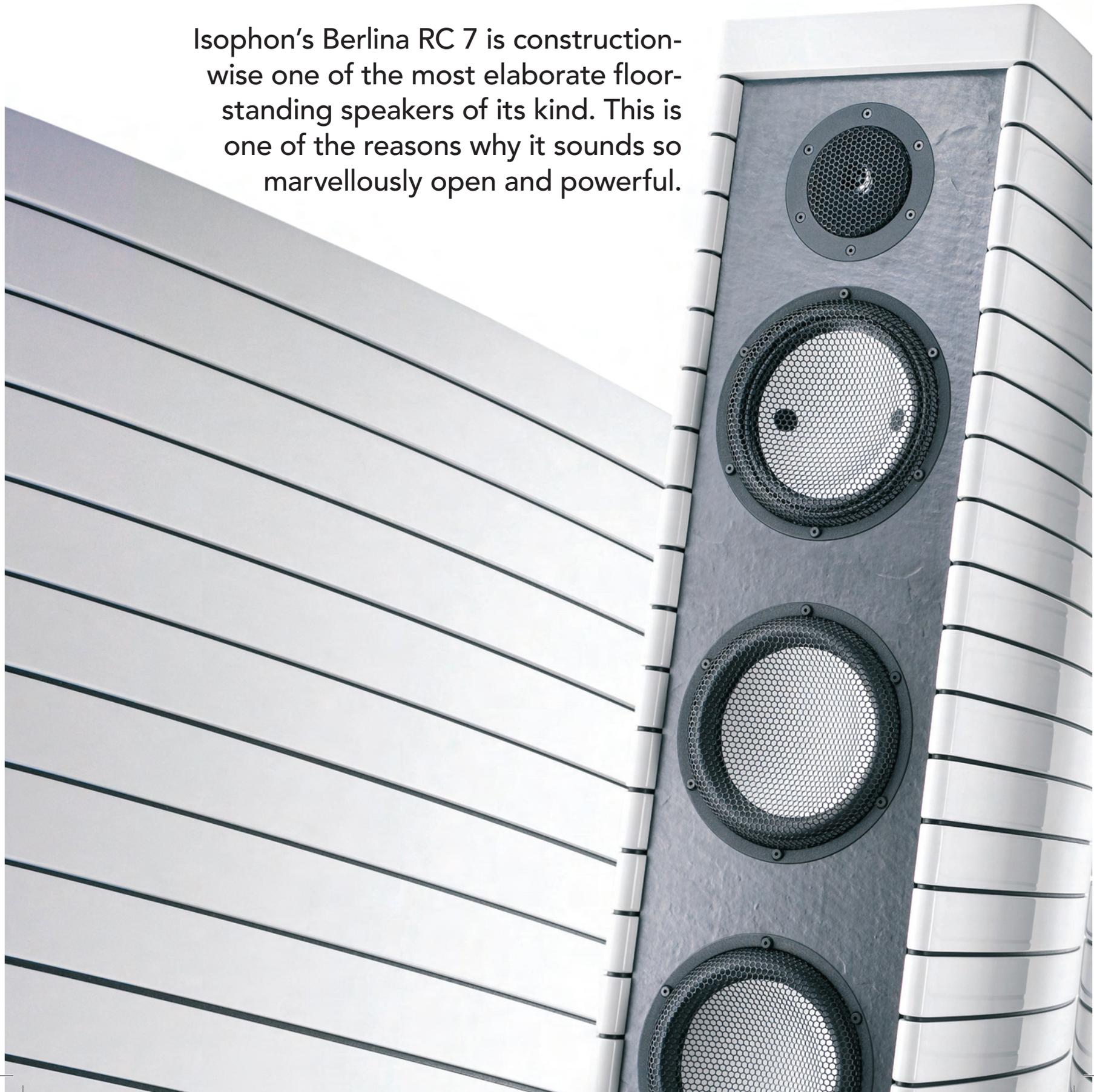
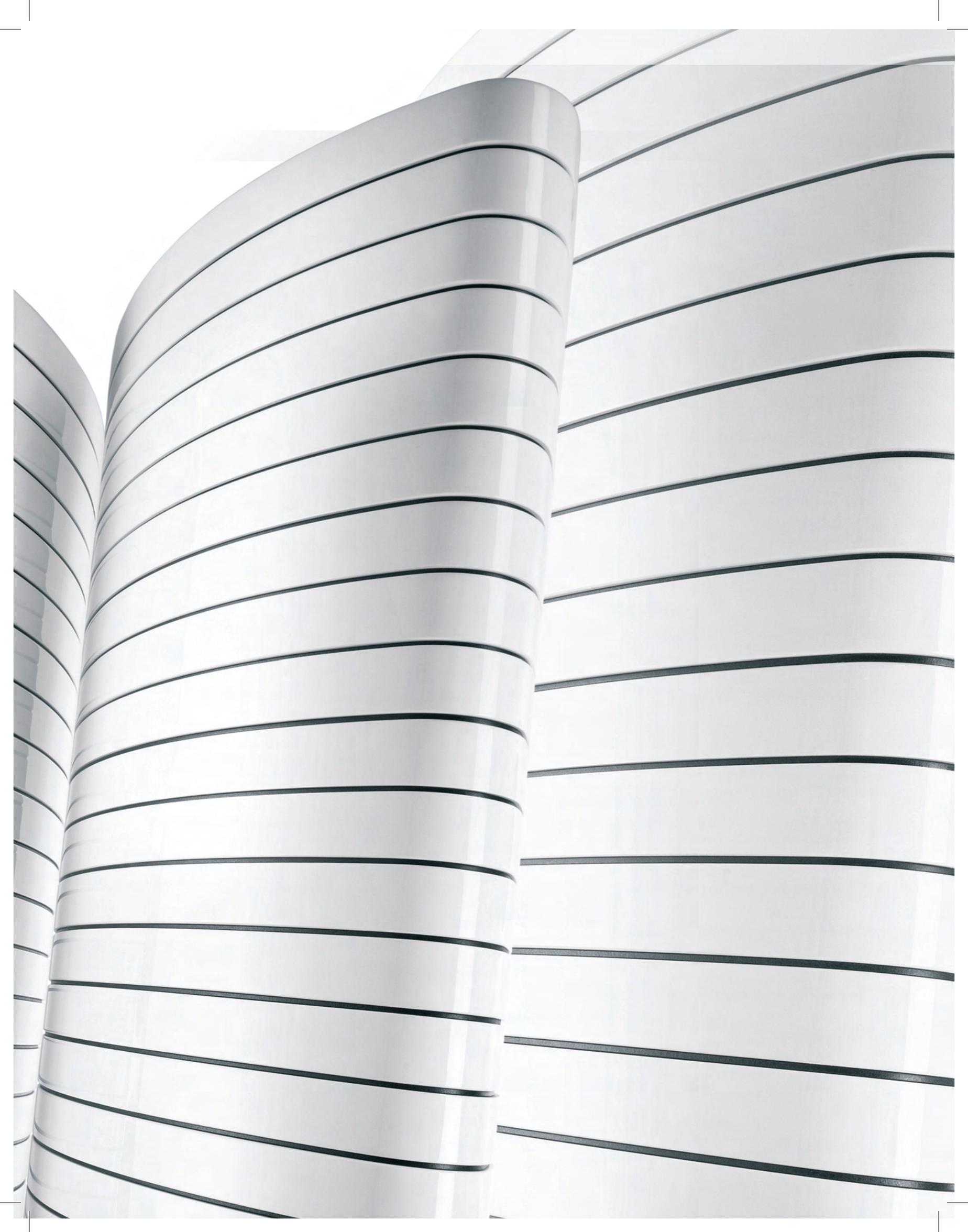


# Made with **Love**

Isophon's Berlina RC 7 is construction-wise one of the most elaborate floor-standing speakers of its kind. This is one of the reasons why it sounds so marvellously open and powerful.





**Autor:** Wolfram Eifert

**A**mbitious hi-fi geeks know this phenomenon: Whether you're at the shop or experimenting at home – the major difference in reproduction quality comes from the speakers. The reason for this is the fact that with transducers, there is an incredible number of sound-relevant components interacting, mechanical as well as electrical.

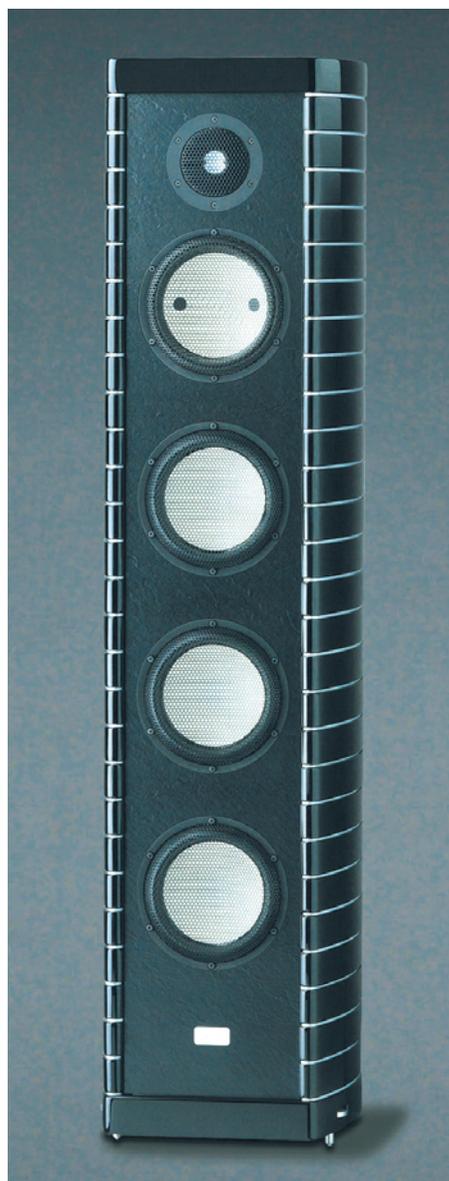
Large differences in sound are at the same time fascinating and frustrating as it is not always the case that what you hear can be scientifically described. Sometimes all it takes is the replacement of a capacitor in the frequency crossover

by a different one, and a new world suddenly opens up. In most cases there will be no metrological difference, and if there is, it is microscopical. Nevertheless your ears report more micro-dynamics, more spatial depth and less stress with high dynamics.

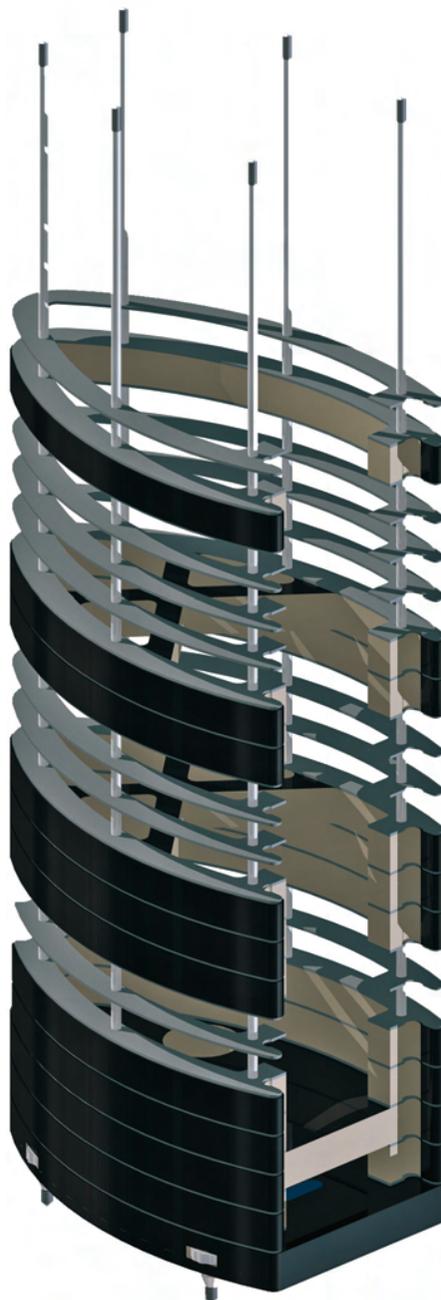
Such were the experiences the Iso-phon team gained when developing their Berlina RC 7, which prompted them to update the filters before launching into serial production: two capacitors within the midrange and treble section were replaced with custom-made ones from Cologne component specialists Mundorf. Even Iso-phon mastermind Roland Gauder cannot find a cogent explanation for the

significant improvement in sound. Rarely at a loss for words, in this case he merely shrugged and said: 'It sounds better so let's do it.'

The choice of what tweeter is to be installed in the Berlina is left to the customer. Manufactured by Accuton in Pulheim, the inverted dome integrated by Iso-phon can be ordered either in a ceramic or in a diamond version. The finer, more natural and more true-to-life sound of the latter has its origin in a higher rigidity and an even faster sound propagation within the diaphragm. The only snag though: the posh tweeter increases the price of the pair of Berlinas by a hefty 6,000 euros. A subsequent upgrade,



The Berlina in piano lacquer black with white spacings.



The elaborate rib construction is based on a combination of very rigid and moderate soft elements, kept together by strong steel bars. The baffle is covered in a thin layer of stone, thus increasing rigidity.



however, is possible without much further ado, since the tweeters are designed in such a way that they can be exchanged without having to adapt the filter.

The cones for bass and midrange work with high-strength ceramic diaphragms that have proven their worth in other models before. The matt grey opalescent material is as hard as porcelain – yet just as sensitive against mechanical influences. That's why the metal grille on the front of the driver is essential. The backs of the diaphragms are covered with grids of Kevlar reducing the hazard of diaphragm bursts. Any anxieties regarding the longevity are purely academic. During the AUDIOphile review the Berlina

underwent hours and days of working under heavy levels without showing any sign of stress or overload.

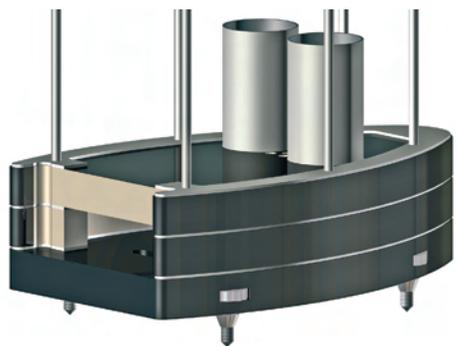
The confidence Dr. Gauder shows in his product is evidenced by presentations under the harshest conditions at trade fairs. During the Norddeutsche HiFi-Tage in February 2011 the Berlina smoothly commanded 70 square metres of room. At the HIGH END in Munich there will be over 100 square metres – plus a correspondingly high number of listeners that will absorb the acoustic energy. You don't have to be a room acoustics expert to deduce that the Berlina is capable of confidently covering even large living spaces.

Two of the constructive elements are new and both of these are of considerable significance to the sound quality: The cabinet is constructed in a rib design and the crossover filters are carried out in a fully symmetrical design. The steep filters (for details see the technical summary at the end of the test) reduce the overlapping areas between neighbouring drivers to an absolute minimum and consequently keep away any frequencies outside the respective working areas.

The result is an exceptional purity of sound and a plasticity pervading the aural experience. A large proportion of the exceptional ability to perceive the individual sound nuances is owed to >



Depending on their tasks within the speaker cabinet, the design of the ribs is vastly different. Some are strutted, others form closed chambers or help fix the reflex tubes. There are spikes integrated into the base plate, which can be adjusted via a rotating mechanism.



First the ribs are loosely stacked. The pressure necessary for stability is provided by the bars.



The contacts of the three-step room adjustment can be found in the upper part of the terminal. Standardly, it is not designed for bi-wiring.

The extremely rigid diamond dome is only 20 millimetres in diameter. The grille is fixed.



the new rib construction of the cabinet. It is moderately heavy – one speaker weighs 52 kilograms – and at the same time extremely rigid and highly neutral with regard to the sound over the whole frequency range.

Instead of the usual continuous wall areas, the Berlina cabinets consist of individual, extremely rigid ribs of just below four centimetres of MDF stacked upon one another. Between these there are layers of considerably softer insulating material preventing any propagation of resonance. Material and design are aligned in such a way that to a large extent the cabinet remains silent over the entire (!) audible range without adding any colourations of its own to the sound of the drivers.

This design is the result of a research project that was sponsored with public money. The results are so convincing that more RC models – the abbreviation stands for “Rib Construction” – are up and coming. All in all there will be five models, of which there are some laboratory prototypes already existing. Particularly far in its development stage is

the new Isophon flagship, the RC 11, that will be the first to sport a diamond diaphragms for the mid-range. The price however, will run to six figures.

Six threaded bars made of steel, three on every side, press the ribs together and prevent any sliding between them. At the end of each bar there is a threaded nut, which is pulled tight at the end of assembly with a defined torque. Depending on its position and task within the cabinet, each rib is individually shaped. The lowest element has spikes integrated that can be adjusted in height to the very millimetre without the help of tools. Floor contact is achieved in no time thanks to its moderate weight and uncomplicated, adjustable spikes.

Shifting and turning, as it is inevitable with some over-sensitive ones, will hardly be necessary here. The midrange and tweeter have the correct height for a sitting person.

Neither the position of the speaker nor that of the listener have to be chosen in too finicky a way. Amp-wise a bolide strong in delivering high current wouldn't go amiss, but freedom of choice in part-

## Isophon Berlina RC 7 (Diamant)

**List price:** €30,000

**Warranty:** 10 years

**Dimensions:** WxHxD (cm): 23 x 122 x 46

**Weight:** 52 kg (apiece)

Cabinet design: thick ribs finished in piano lacquer black or white, thin ribs in any RAL colour

Terminal options and features: Single wiring or bi-wiring optional, three-step bass adjustment

### **Distribution:**

Acoustic Consulting GbR

Merklingerstraße 67

D-71272 Renningen

Germany

Phone: +49 - (0)7159 / 920 161

Internet: [www.isophon.de](http://www.isophon.de)

ners is higher than usual in this league. We liked the Berlina best with tendentially warm and musically attuned components.

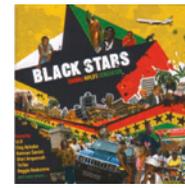
The jumper of the bass filter will mostly be in the neutral – or even negative – position, since the RC 7 is a decidedly bass-heavy transducer that won't leave you missing anything in the deep registers except certain sub bass portions below 30 Hz that are traditionally the domain of electronically equalized active speakers. What the Berlina can't handle are ear-shattering levels as are common in the stage area of rock concerts. We didn't miss this kind of intensity since, due to its exceptional purity, the RC 7 has such a strong expressiveness that modest volumes are absolutely sufficient.

Prejudices against hard diaphragm materials generating exactly such sound characteristics have been proven as old wives' tales once more with the RC 7. The 2006 self-titled album of the American singer and pianist Peter Cincotti is reproduced by the Berlina with such a velvety overall perfection that it is likely

to bring tears of joy to the eyes of sensitive listeners. Despite, or perhaps because of this unagitatedness the piano and double bass in the swing classic 'Ain't Misbehavin'' sound breathtakingly clear and natural. The male voice is profoundly sonorous and by no degree obscured by the accompaniment.

The impression of such epoch-making attention to detail is also retained with more complex material. The Ghana's Hiplife Generation's (see our record recommendation) 'Black Stars' album with its hip hop and reggae influences, that can sound rather harsh through mediocre speakers, seemed like a welcomed breeze for the Berlina.

The African rhythms dart through the listening room as if Isophon wanted to reinvent the term joy of playing. Fattest bass impulses powerfully churn out of the speakers without any droning, interspersed with the choral background in holographic precision. Such a mass of joie de vivre is contagious. That's why we highly recommend the Berlina RC 7 diamond.



## Test-CD Ghana's Hiplife Generation: Black Stars

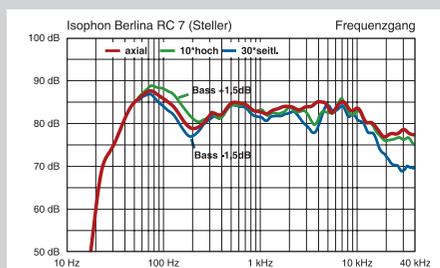
The album is a kind of sampler compiling the expertise of several musicians from Ghana. The buoyant mix of hip-hop and reggae sounds extremely multifaceted and challenges the speakers to the utmost.



## The author Wolfram Eifert

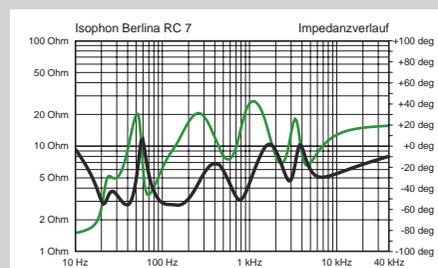
studied Electrical and Media Technology before starting his journalistic career with stereoplay at the end of the 80s. A dedicated amateur chef and music enthusiast, he is currently Germany's most experienced speaker tester.

### The diagram: Frequency response



The remarkably powerful bass has its maximum at about 60 Hz. The three-step room adjustment changes the ratios of the levels among each other in a subtle way. Nevertheless, since the steps are practice-oriented, they can be clearly heard. The dip around 200 Hz is largely equalized by the room.

### The diagram: Complex impedance

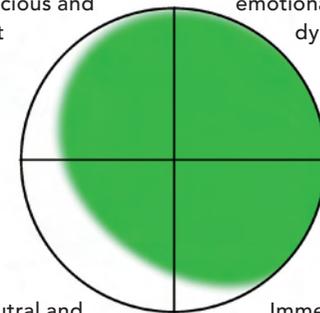


The diamond-fitted tweeter loses some of its level above 10 kHz, yet its directivity pattern is so broad that there is sufficient energy available in the room. Electric impedance (black curve) reaches minimum values of 2.8 ohms in the bass range. Load behaviour and sensitivity of nearly 83 decibels at 2 volts is quite good-natured.

### AUDIOphile Character

Effortlessly spacious and soft

Grippingly emotional and dynamic



Neutral and authentic

Immediacy high resolution

### AUDIOphile Potential



### Recommendation

Characteristics range from tender to majority-appealing and fit all musical tastes. The powerful bass demands rooms of at least 30 sqm and free-standing positioning.

# Vorsprung durch Technik

by Wolfram Eifert

**S**lumbering within the belly of the Berlina is a multi-component crossover that achieves extraordinarily high levels of edge steepness and keeps the overlap areas between adjacent chassis small. The following lines make clear why Isophon goes to such effort.

A filter's barrier effect is stated in decibels per octave. Traditional crossover networks rarely achieve steepness levels of more than 12 to 18 decibels. Higher values fail to be achieved due to the load characteristics of the chassis, which act themselves like filters and aren't particularly impressed by a few more or less randomly selected components.

Loudspeaker chassis regard traditional approaches to the sizing of separating filter components as ohmic resistance with a load at constant frequency. But in reality the impedance fluctuates with the frequency in a manner typical for dynamic drivers. In order to represent this behaviour in a quasi-realistic manner, seven components are needed that can accept any value. Gauder takes account of these interrelationships in his simulations and is thus able to coordinate chassis, cabinet and filter much more precisely. The mathematical effort is gigantic.

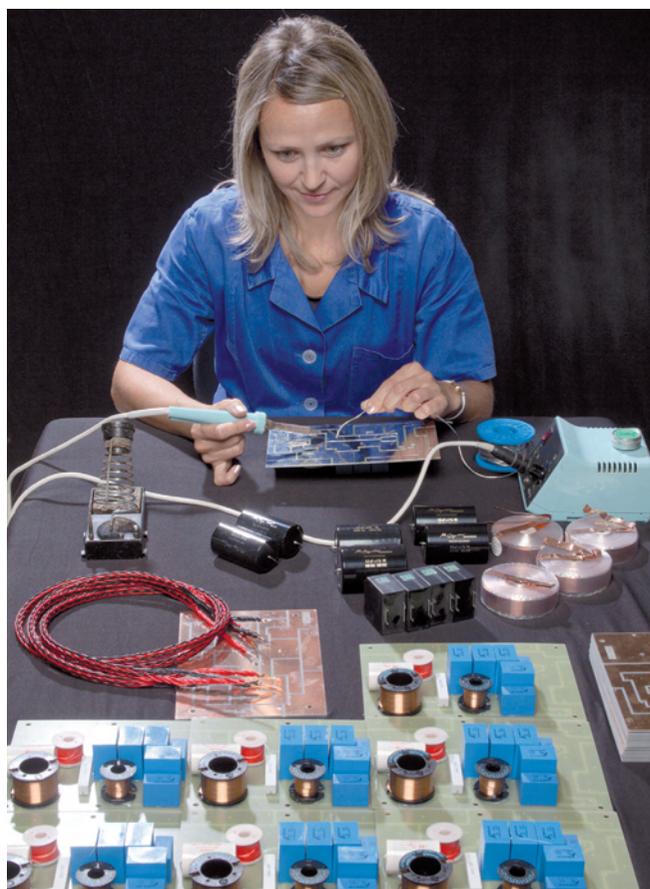
In order to keep the computational load manageable, the doctor of physics uses fourth-order filters with 24 decibels per octave, which are selectively enhanced with additional components so that in the end steepness levels of close to 50 decibels per octave are achieved. With this approach he and his label, Isophon, are pretty much out on their own. As far as we know, there is only one manufacturer in the world that kits out passive speakers with similarly high-edged filters: Magico from the USA. Atypically for large floor-standing speakers the bass

on the Berlina also goes through a band-pass filter. A second-order electrical high-pass filter and the bass reflex system acting as a fourth-order mechanical high-pass filter form together a sixth-order system. Unnecessary infrasound or the rumble of analogue record players thus gets effectively filtered out. Audiophiles need fear no acoustics drawbacks. Quite the opposite: the bass feels extremely multi-layered and clean and the timing first-class.

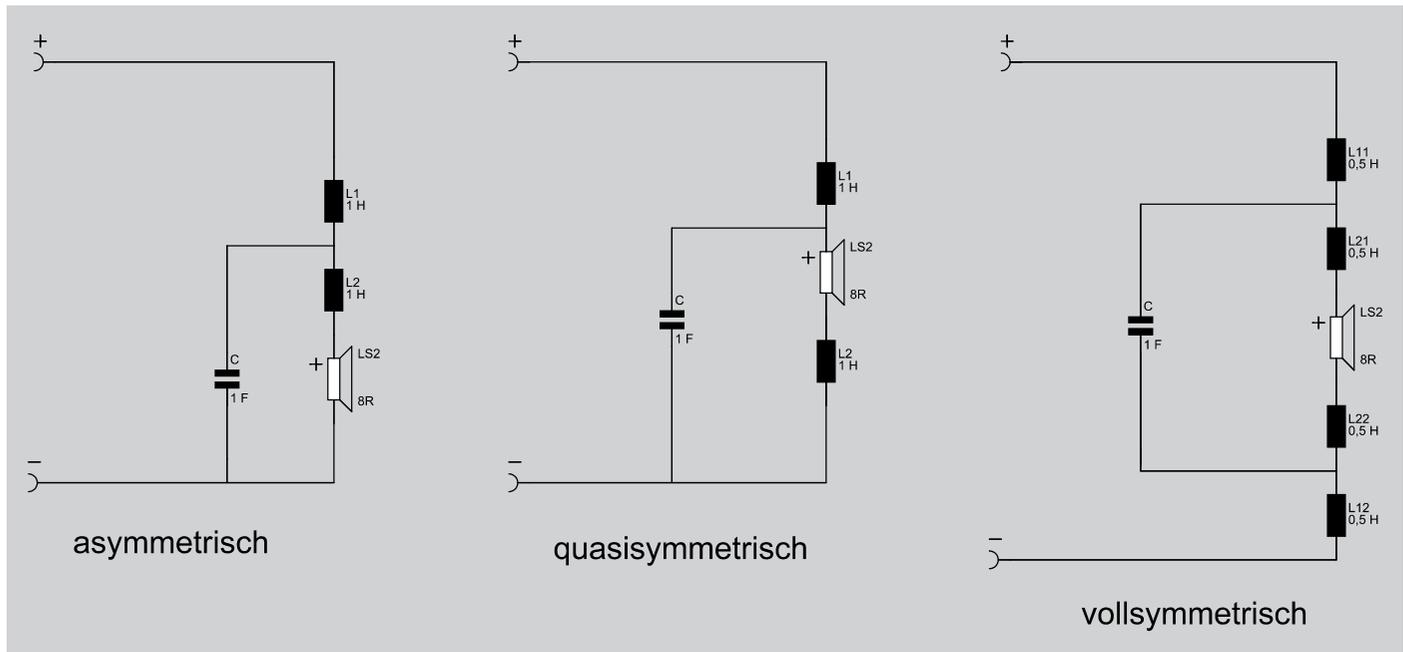
The steep filters go ideally with the ceramic chassis, as the bone-hard membranes work extremely cleanly in the intended usage range, tending, however, at higher frequencies towards an

unfriendly intrinsic sound that the filters comprehensively shut out. Just 20 millimetres in size, the diamond tweeter's membrane does not start to resonate, depending on material, until around 80 (!) kilohertz, several octaves above the audible threshold.

The Berlina network is the first crossover filter known to us to have a fully balanced arrangement of the components. To achieve this, the values are split and positioned a half each in front of and behind the chassis. As the frequency characteristics are not to change, the nominal values of the inductors (coils) have to be halved and those of the capacitors doubled.



The crossover networks are assembled in the traditional way by hand at Isophon itself in the Swabian town of Renningen. The black and red inner wiring is tried and tested in many models and comes from Clearwater



Design of a third order low-pass filter: in the case of the fully balanced variant on the right both coils are split and the chassis is decoupled to ground. Separating frequency and edge steepness are in each case the same.

It is Gauder's experience that the balanced versions sound better, although there is no hard and fast explanation for this. The dual-sided embedding of the chassis into the filter components appears to create a distance to the amplifier that has a positive effect on the sound, especially in the case of appliances with low overall feedback. And, despite its thirst for power, the Berlina does indeed cope surprisingly well with valve amplifiers.

The sophisticated technology helps the Berlina to achieve surprising texture that is reminiscent of wide bandwidth systems – without their limitations in terms of neutrality and dynamic range. In order to sound out its talents, recordings with spectacular changes of dynamic are ideally suited, but by no means absolutely necessary. On the fourth CD of sister magazine AUDIO's listening course (Dec. 2005 issue) you will find a

The somewhat smaller circuit board on the left and the transformer core coil with accentuated current capability are assigned to the bass range. The components for mid-range and high frequencies are arranged away from each other.

comparison of three Italian violins from the years 1640 to 1771. The Berlina brings out here a wealth of acoustic colour and nuance that beguiles not just classical music fans.

Despite the outstanding enthusiasm, the character of the sound as a whole is perfectly serene, warm and free of any

abrasiveness. As Germany's most popular singer Herbert Grönemeyer once put it so well in his lyrics: "Männer sind außen hart und innen ganz weich" (Men on the outside are hard and on the inside very soft). In the case of the Isophon Berlina, too, these opposites are no contradiction. <

