

# elodis subwoofer

*Brochure*

## ***ELODIS-SUB-VB21***

*Version L – for deeper bass reproduction*

*Version H – for higher sound pressure level*





# ELODIS-SUB-VB21



**ULTIMATE SUBWOOFER**  
for

- ▶ *big listening rooms* ◀
- ▶ *highest acoustic performance* ◀
- ▶ *best results in both music and home cinema applications* ◀

# ***ELODIS SUB-VB21L - ELODIS-SUB-VB21H***

- *Passive subwoofer*
- *21-inch-drive unit*
- *Bassreflex (two different tunings)*
- *Enclosure: Panzerholz®*
- *Aluminium-frame*
- *All parts screwed*
- *700 pieces M8-screws*
- *SPL max. - Quarter-space:*
  - *$\geq 124$  dB/1m (VB21L) from 19 Hz*
  - *$\geq 127$  dB/1m (VB21H) from 23 Hz*
- *19 Hz (-3 dB) up to 120 Hz (VB21L)*
- *23 Hz (-3 dB) up to 120 Hz (VB21H)*



Photos:  
Bubinga veneer  
High gloss finish



*A great variety of  
different paints and  
veneers are possible*

*Edges and curvatures may be worked differently*

*Surfaces made of e.g. Marlan® or aluminium are possible*

*The speaker covers will be worked according to the customer's  
wishes and upon prior arrangements with regard to the design*

# *Dimensions Elodis-Sub-VB21*

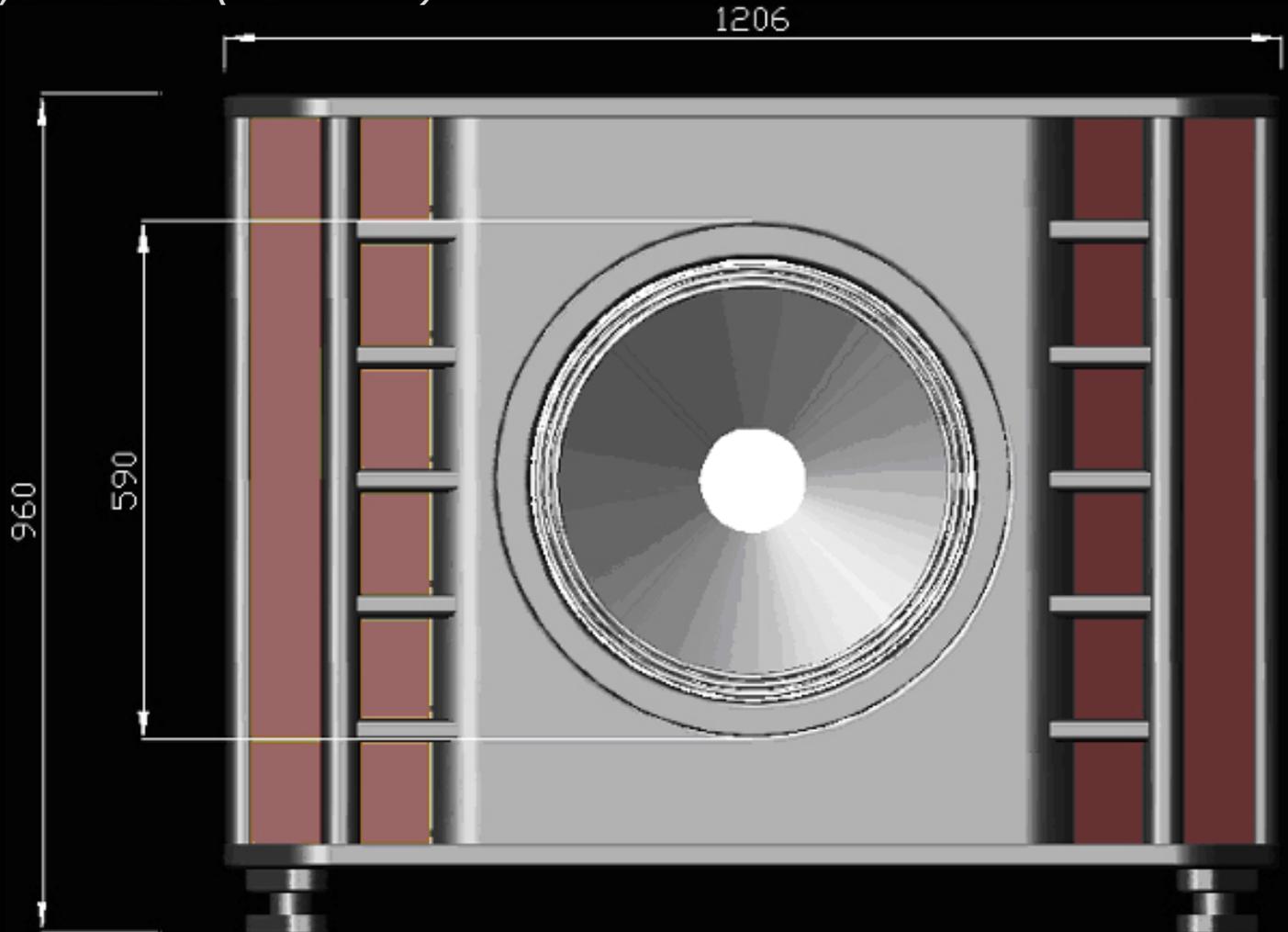
*Height = 37,8 – 39 inches (960 - 990 mm), adjustable*

*Width = 47,5 inches (1206 mm)*

*Depth = 31,3 inches (794 mm)*

*Weight:*

*970 Ibs.  
(440 kg)  
net*



## ***Theoretical implementation of the ELODIS-SUB-VB21***

*As I was neither constrained to use certain components or materials, nor to meet any restrictions with regard to costs and time, I did not have to make compromises when developing this subwoofer.*

*With the help of efficient simulation and measuring software a big number of possible approaches was optimised until no further improvement was possible. All these results were carefully compared to each other. By carefully considering the respective advantages and disadvantages it was tried to find the solution which would yield*

***the best and most balanced final result***

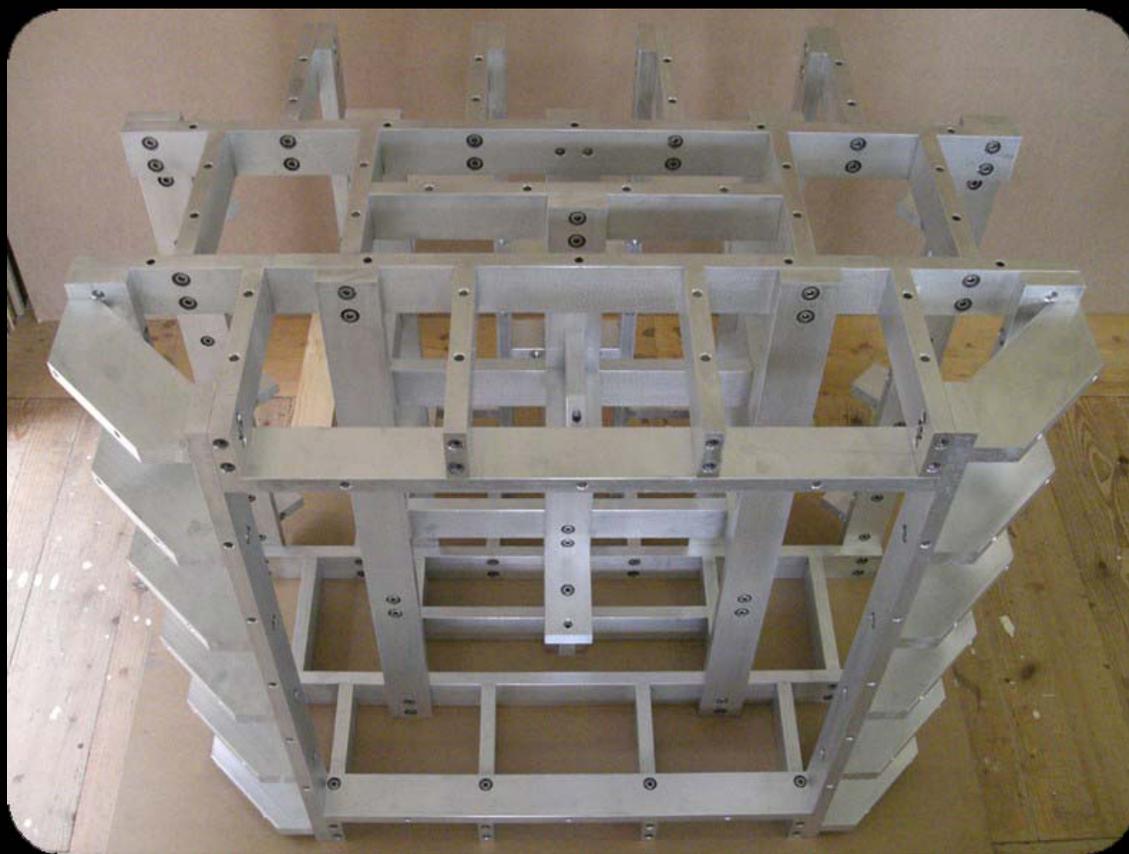
*A big vented box with a single, but enormously robust and powerful and above all acoustically outstanding 21-inch-drive unit eventually proved to be the best and most balanced solution.*

***As a result the best ratio between enclosure size, achievable sound level and power demand could be achieved.***

**To implement an enclosure that does not have an impact on the sound quality it is necessary to use suitable materials and stabilisation measures**

*Pressed wood (**Panzerholz®**) for the enclosure and aluminium for the bracing proved to be the ideal materials for the Elodis-Sub-VB21 subwoofer*

### ***Aluminium frame - Bracing***



*With a particularly stable aluminium frame (110 kg), which at the same time serves as bracing for the enclosure components, all parts of the enclosure as well as the aluminium frame itself are screwed together with M8 screws (about 700 screws and the same number of threaded Ensat bushings) and are carefully sealed*

# Enclosure

*Pressed wood (Panzerholz®) is an extremely hard multi-laminated material in sheet form. It is manufactured from beech veneers and phenol resins under high pressure (approx 40N/mm<sup>2</sup>) and heat.*

*The used quality of pressed wood has substantially higher strength factors than the materials that are commonly used even for very expensive speakers, such as MDF, HDF or multiplex, while at the same time achieving excellent vibration absorption.*

*The used wall thicknesses for Elodis-Sub-VB21:*

28 mm each for bottom and cover  
2 times 28 mm for the rear wall  
3 times 28 mm for the front wall  
2 times 28 mm for the side walls,  
with the bass reflex ports being integrated  
in between



*Pressed wood in the used quality is about 20 times more expensive than MDF and nearly 10 times more expensive than multiplex boards of the same thickness.*

*All fasteners (screws, bushes etc.) are made of stainless high-grade steel*

*A very special and targeted damping inside of the enclosure eventually guarantees that the standing waves occurring in the interior of the rather big enclosure are suppressed effectively wherever necessary, without increasing the enclosure losses that are nearly undetectable and therefore acoustically hardly relevant anyway. Amongst others this can only be seen from the impedance peaks that are reduced by less than 5% and an impedance increase by 0.1 Ohm at tuning frequency compared to the undamped variety.*





## *Ports*

*It was necessary to implement a sufficiently big cross section area of the bass reflex ports despite the big interior volume, which even at full load do not cause any turbulent flows in the channels nor audible turbulences at the output ports.*

*Both the cross section areas of the 12 individual ports and the rounding of the output ports were dimensioned exactly in a way that could meet this requirement. Furthermore, despite the length of the channels, no peculiar channel resonances (standing waves) that might have impacts on the sound quality can be seen in the impedance graph due to special channel shaping.*

# *Key Features*

- *extremely low distortions*
- *extremely low enclosure losses*
- *extremely low mechanical losses of the 21-inch drive unit*
  - *for accurate bass reproduction*
- *very moderate power requirement for full acoustic output:*
  - *around 500 Watts for X-max*
  - *the consequence are very low dynamic compression effects*
- *two different tuning frequencies are available:*
  - ELODIS-SUB-VB21L for deeper bass reproduction*
  - ELODIS-SUB-VB21L for higher max. sound pressure level*

## *Further Features*

- *carefully calculated torques of the screwing as well as securing of the screwing against distortion and lowering*
- *sophisticated sealing system to guarantee durable air-tightness of the screwed enclosure parts*
- *for the interior cabling high-quality big-section silver cables from Van-den-Hul® are used.*
- *optically appealing legs that are designed as height-adjustable screw units (adjusting range 30 mm) in order to facilitate transport and level out any possible unevennesses of the positioning site, as well as to connect the subwoofer to the positioning site in an acoustically optimal way*



## *Positioning of the subwoofer*

*When choosing the place where the subwoofer is to be positioned, it is important to bear in mind that the site should meet all static requirements with regard to the high weight of the device, and in addition should be as little vibration-prone as possible.*

*For a precise bass reproduction the bass driver must be fixed to its place in such a way that it cannot shift when the diaphragm oscillates. The high weight of the subwoofer and its optimal connection to a stable, non-oscillating site are the most important requirements to be met in order to achieve the desired bass reproduction quality.*

*Decoupling the subwoofer from its site by means of vibration absorbers or a vibration-prone site may cause imprecise bass reproduction.*

*The height-adjustable legs with which the subwoofer is equipped guarantee an accurate connection to a suitable site.*

## *Which advantages does a subwoofer offer at all?*

*A subwoofer is not only meaningful for use in home cinemas, but also offers a wide range of advantages when high performance in music reproduction is required:*

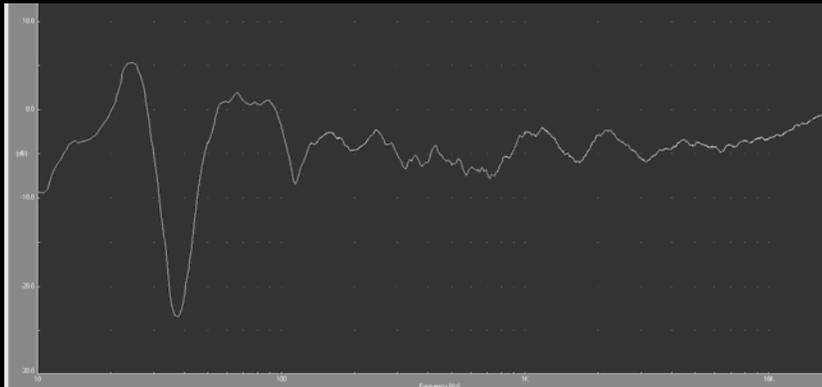
- Due to the separate bass and main speaker units it is possible to positively influence any resonances that inevitably occur in the listening room, as the physically separated units can be positioned in a more flexible and efficient way.*
- In most cases the user will notice that a position that yields optimal acoustic performance for the mid- and high-range as well as for the spatial representation of the sound would prove totally unsuitable for the representation of low frequencies. On the other hand a position where the least room resonances would be caused by the woofer would prove as totally impractical (see **examples next site**).*
- The main speakers can be designed as considerably smaller units with regard to their volume.*
- Even when using big main speakers the above-mentioned advantages can be reached provided that the main speaker units and the subwoofer interact correctly, while additionally reducing the load on the main speakers caused by the reproduction of low frequencies. This results in considerably increased spatiality and airiness of the sound. Furthermore the load on the amplifier of the main speaker is reduced, as it is no longer exposed to the power-intensive low-frequency signal components.*

*Practical experiences have shown that roll-overs and peaks in the bass frequency response, which are caused due to room resonances, may well be in the range of +/- 20 – 30 dB and may even extend up to a full octave even when positioning the main speaker in a suitable way.*

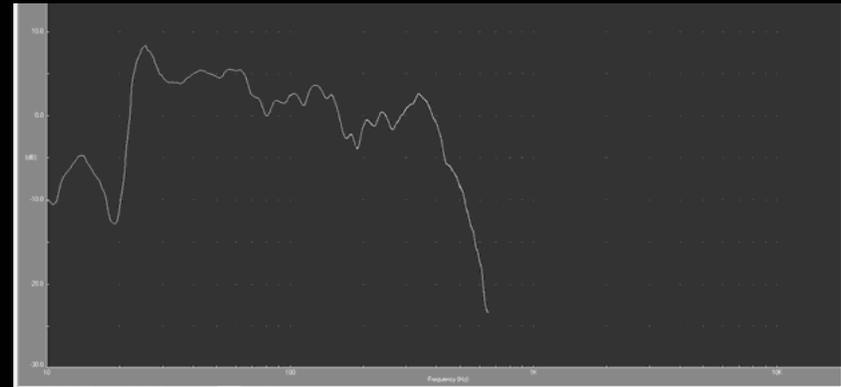
*When working with separate subwoofer and main speaker units the use of digital room correction systems pays off, as for various reasons major roll-overs in the frequency response cannot simply be levelled out by means of adequate amplification.*

*Correct use of digital room correction systems enables an optimum adaptation of all speakers to the room both on a frequency and on a time level. In this way a balanced frequency response as well as a substantially increased spatial representation of the sound at the user's listening place can be achieved. Such devices are available both for stereo and for multi-channel film sound reproduction and also include all required filters to limit the transmission range of the respective speakers.*

*Examples:*



Typical frequency response of a suitable positioned high-end loudspeaker at the listening place



Frequency response of a suitable positioned subwoofer at the same listening place

## ***Recommended employment***

*The subwoofer is particularly suitable for use in systems which include a central control unit that controls the entire system and adapts it to the room.*

***Moderate equalizing down to 20 Hz  
depending on room conditions  
by using high quality ROOM-CORRECTION-PROCESSORS  
or other high quality LOUDSPEAKER MANAGMENT SYSTEMS  
is highly recommendable.***

*Adapting only a single component of the system such as the subwoofer to the room and the system is and cannot be a perfect solution, but just a provisional one. Therefore this subwoofer is not equipped with any amplifier or filter circuits. As a result the user has the possibility to use either existing electronics or electronics that are recommended or seem to be most suitable for this purpose.*

*To be able to make full use of the efficiency of the subwoofer, powerful outputs with a high damping factor are highly recommendable.*

## **Technical Details:**

*For detailed measurement data see also:*

Brochure: [Measurement\\_Data\\_Elodis-Sub-VB21L-en.pdf](#)

### ***Recommended frequency range:***

*Lower cut-off frequency – 120 Hz in home cinema systems (the LFE channel in DD 5.1 systems ranges up to 120 Hz)*

*In music systems the crossover frequency is selected according to the used main speakers.*

### ***Lower cut-off frequency (-3 dB) at optimum prefiltering:***

*ELODIS-SUB-VB21L: 19 Hz*

*ELODIS-SUB-VB21H: 23 Hz*

### ***Maximum acoustic pressure in the ideal operational range of the voice coil (< X<sub>max</sub>) in a Quarter-space environment (1 Pi, wall/floor junction placement) at optimum prefiltering:***

*ELODIS-SUB-VB-21L: ≥ 124 dB/1 m from 19 Hz (129 dB/1m X-mech!)*

*ELODIS-SUB-VB-21H: ≥ 127 dB/1 m from 23 Hz (132 dB/1m X-mech!)*

***Max. sound pressure levels are specified at max. 5% THD at any frequency and max. 2 % THD averaged from 20 – 100 Hz!***

***Minimum impedance: 6,5 Ohm***

***Power rating:***

***Electrical: AES Standard – 1000 W, Program Power – 2000 W***

***Mechanical: X-max = +/- 10 mm, X-damage = +/- 17,5 mm***

***For X-max (from 19 Hz resp. 23 Hz) around 500 Watts are required***

***Maximum 1000 Watts are recommended***

***Suitable subsonic filters must be used***

***Dimensions and weight:***

***Height: 960 mm (37,8 inches) with lowered legs, 990 mm (39 inches) with extended legs***

***Width: 1206 mm (47,5 inches)***

***Depth: 794 mm (31,25 inches)***

***Weight: 440 kg (970 Ibs) net***

## ***Recommended protective measures for the drive unit:***

*To protect the speaker from mechanical destruction below 20 Hz a fitted subsonic filter (high-pass filter) must be used!*

*The ideal crossover point and filter order may vary individually according to the use and positioning of the subwoofer in the listening room and therefore can only be optimized after delivery and set-up of the subwoofer.*

***Max. sensible output voltage of the power amplifier should be limited at 50 Volts Rms!***

*Recommended maximum dimensions of the listening room for one piece of*

*Elodis-Sub-VB21L:*

*Up to approximately*

*700 cubic meters*

*equal to*

*25,000 cubic feet*

*which would correspond to the size of a cinema hall with about  
125 seats*

## *Services*

*Upon your request I will try to provide any assistance that may be necessary in the set-up and integration of the subwoofer into your system so that you will be able to make full use of the capacity of the subwoofer.*

*By providing an accurate description of the planned use of the subwoofer, as well as of the listening environment, the best possible assistance can be provided right from the beginning of the project.*

### *Enclosure designs:*

*A great variety of different paints and veneers are possible. Edges and curvatures may be worked differently from the design shown in the photos.*

*Surfaces made of e.g. Marlan® or aluminium are possible. The speaker covers will be worked according to the customer's wishes and upon prior arrangements with regard to the design.*

*The design of the subwoofer is protected at European level.*

## ***Warranty:***

*5 years for all components as well as their flawless function, determination and properties for the first owner, except damage that is caused due to improper use of the subwoofer or damage of the subwoofer itself (in particular a burnt-through voice coil or damage that has been caused due to excessive cone excursion).*

## ***Product liability:***

*We cannot assume liability for any damage that may occur in relation with this subwoofer (e.g. hearing damage, static damage of the existing building fabric of the listening room, etc...).*

## ***Distribution:***

*Distribution is currently limited to the producer*

*Manufacturing takes place exclusively according to individual customer order*

*Delivery time is about 3 – 6 months, depending on the ordered design*

*Delivery transport insurance and shipping costs will be paid and organized by Elodis Subwoofer.*

*Otherwise the respective legal provisions on dispatch and transfer of risks apply.*

# *Copyright:*

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**elodis subwoofer**