VTC PRO AUDIO

Elevation Series ELS118

Subwoofer

Features:

- Tapped Horn Subwoofer Design (patent pending)
- Long Excursion High Power 18-inch Woofer (with 5.3-inch Voice Coil)
- Low Distortion Down to 35Hz
- Maximum SPL 140dB
- Solid Marine Grade Plywood Cabinet Construction
- UHMW Skid / Stack Rails (Bottom & One Side)
- Double Stack Dolly Available (ELS118D2)

Description:
The Elevation Series ELS118 Subwoofer uses an innovative new technology developed by Tom Danley called a Tapped Horn design (patent pending). The Tapped Horn maximizes driver efficiency by allowing radiation from the rear of the driver to enter the system at a tap, located further down the horn flare towards the mouth.

Built for long term reliability in even the most demanding touring applications, the Elevation Series ELS118 Tapped Horn subwoofer uses high quality proprietary 18-inch neodymium long excursion driver by 18 Sound. VTC cabinets and subwoofers are built in North America using a solid void-free marine grade Baltic birch plywood cabinet construction.

The Theory behind Tapped Horn Technology

(*Patent Pending*)

Horns have been used for decades in sound reinforcement to increase the loading on the loudspeaker driver. This is done to increase the power transfer from the driver to the environment in which the sound is radiated. For maximum power transfer to occur an impedance match between the loudspeaker driver and the free air in which it is operating must be established. A horn is the means to this impedance match. For a horn to operate properly it must not be acoustically small compared the frequencies (wavelengths) it is to radiate.

Conventional horn design is based on this assumption. To meet this requirement the horn needs to be at least one-half wavelength long at the low frequency cut-off of the horn and the circumference of the mouth must be at least one wavelength. When used for low frequency (long wavelength) reproduction this can make for a very large unwieldy horn that can becomes impractical to build or to move in real world applications.

A common practice used in conventional subwoofer design is to reduce horn size to only one-quarter of a wavelength long at the low frequency cut-off. This “short cut” has some very interesting and not entirely desirable effects on a horn’s performance. The net result is that, while there is output from a “short cut” subwoofer horn design in its low frequency range, the horn will not yield efficient power transfer until it begins to reproduce higher frequencies closer to one-half wavelength long relative to the horn dimensions.

In order for a quarter wavelength horn design to be driven efficiently, it is imperative that we understand the conditions presented to the driver at the horn’s throat and match these conditions for maximum power transfer.

A quarter wavelength resonance will have a velocity minimum at the throat compared to the half wavelength resonance that will have a velocity maximum at the throat. The velocity minimum condition requires that the proper loudspeaker driver have a much stronger motor (larger magnet) and a larger moving mass than conventional horn theory dictates. The downside is that this driver is not at all well suited to drive a conventional horn, and once the frequencies present in the audio program increase to the point that the horn is at least one-half wavelength a conventional horn is exactly what we have. Any efficiencies gained in the extremely low end with a heavier driver is quickly lost as frequency rises.

Since it is obvious that no loudspeaker driver that can change physical size, weight and mechanical parameters depending on frequency, the solution is to reinvent the horn, not the driver.

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The Application of Tapped Horn Technology

The Elevation Series Tapped Horn Subwoofer (patent pending) allows the radiation from the rear side of the 18-inch long excursion drivers used in the ELS118 to enter the horn at the tap, as well as the throat of the horn.

Since the rear of the driver is much closer to the mouth of the horn, at very low frequencies it is effectively de-coupled from the system and this radiation does not affect the total output. As frequency increases the situation changes and the rear of the driver begins to be coupled to the horn.

When the frequency is such that the horn is one-half wavelength long the rear of the driver is fully coupled to the horn. The pressure from the front and rear of the driver are of reverse polarity; a 180° phase shift at all frequencies. The pressure from the front of the driver (at the throat) and the pressure from the rear of the driver (close to the mouth) are now approximately one-half wavelength apart. This represents a phase shift of 180°. At this frequency both the front and rear of the driver is driving the horn in phase. When this happens the driver's radiating surface area (Sd), as far is the horn is concerned has almost doubled since the driver radiates from the front and back of the diaphragm.

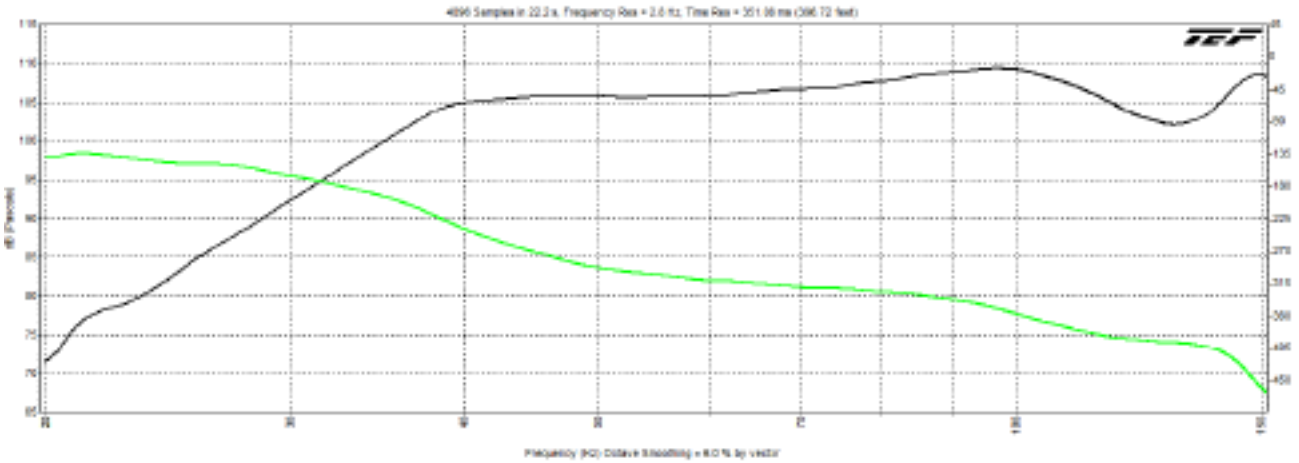
In real world applications where the measured SPL is comparable for a conventional vented horn and a tapped horn design, the diaphragm excursion of the drivers are greatly reduced due to the acoustical loading of the horn. This decrease in excursion will translate directly into lower distortion and far higher output capability from the Tapped Horn.

Specifications:

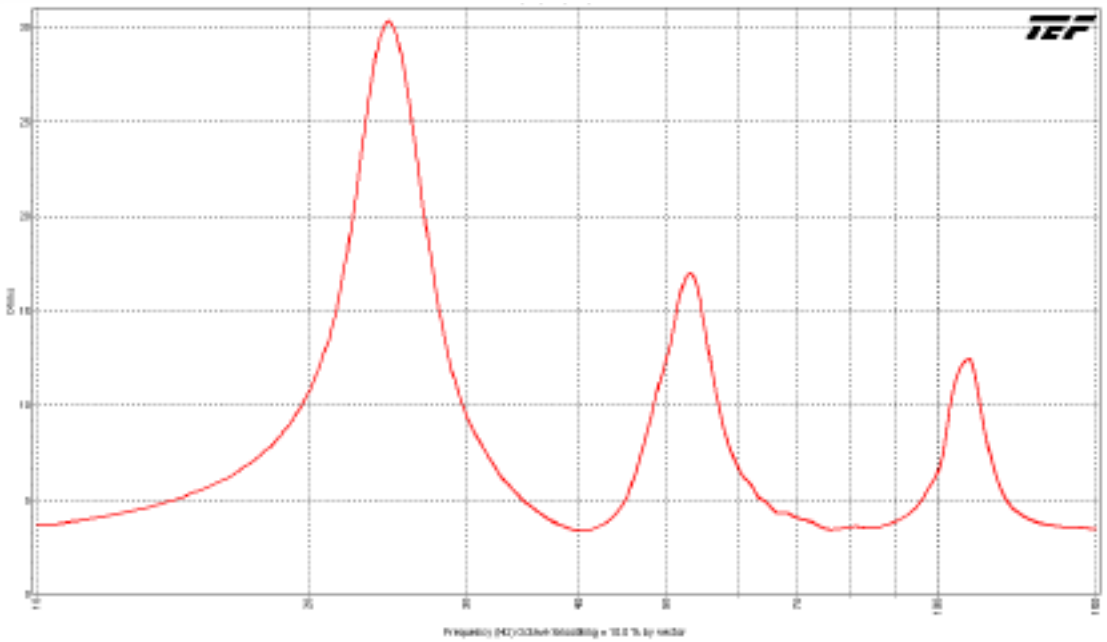
Configuration	Tapped Horn Passive Subwoofer
Driver Components	18-inch Long Excursion Neodymium Woofer
Frequency Response:	35Hz-200Hz (-3dB)
	31Hz-260Hz (-10dB)
Continuous Power	3600 watts Program
Sensitivity (measured 1w/1m)	105dB
Maximum SPL	140 dB
Nominal Impedance	4 Ohms
Recommended Processing	20Hz High pass @ 24dB/Octave Linkwitz – Reilly
	90Hz to 100Hz Low pass @ 24dB/Octave Linkwitz – Reilly
Connectors	Neutrik Speakon® NL4MPR in Parallel (x2)
Enclosure Material	5/8-inch 11-ply Baltic birch
Finish	Black Texture Coat
Grille:	Perforated Formed Powder Coated Steel
Dimensions (DWH, inches)	33.75 x 28.4 x 33.75
Dimensions (DWH, cm)	86 x 72 x 86
Weight (lbs/kg)	174 / 79

Specifications subject to change without notice.

Response Unprocessed
1w (2.8V) 1m Ground Plane



Impedance
Magnitude



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