RADIAPRO
The Power of Clarity

NEO-8
NEO-8 PDR

The NEO-8 and NEO-8 PDR

High Performance Wideband Planar Magnetic Transducers

The NEO-8 and NEO-8 PDR are planar-magnetic (ribbon) transducers that use an innovative high-tech diaphragm material called Teonex® from Dupont. This material, combined with a new proprietary technology for etching the aluminum/Teonex® laminate, makes it possible to overcome the usual limitations of previous generation planar-magnetic designs. Traditionally most planar drivers were built using a Mylar® diaphragm but Teonex® has a much higher thermal limit, lower mass, better durability and mechanical stability. As a result, the NEO-8 and NEO-8 PDR transducers have higher sensitivity and power handling as well as excellent sound quality. The careful design and unique assembly technology employed by these units allow for more extended high frequency output, less distortion and higher dynamic range than with few other planar drivers of similar size.

The NEO-8/ NEO-8 PDR have a push-pull symmetrical magnet system that has been designed with the help of Finite Element Analysis software to achieve optimum efficiency/cost performance. It uses the newest grades of neodymium – the "super" magnet material with the highest magnetic energy. The extremely light Teonex® diaphragm with an etched planar aluminum conductor is suspended in a magnetic field and is uniformly driven by the electromagnetic force providing accurate and immediate reproduction of the input signal. NEO-8 / NEO-8 PDR do not have heavy voice coils, spiders, glue joints, paper cones and surrounds, there is virtually nothing between the electrical signal and the sound - just an almost weightless diaphragm. Hence these planar transducers do not have cone break-up resonance with associated distortion, phase incoherency or signal smearing that is common for conventional drivers. This allows Neo drivers delivering clean, airy, transparent sound that is inherently natural and musically pleasing.

The purely resistive impedance of the NEO-8 / NEO-8 PDR makes an easy load for a power amplifier and greatly facilitates crossover design. The magnet system is completely shielded for safe implementation in multimedia and AV systems. The NEO-8 / NEO-8 PDR are very versatile transducers and their applications are limited only by the designer's imagination.

Fig.1 shows a family of curves representing (from top to bottom) on-axis, 30° off-axis, and 60° off-axis response of the NEO-8 measured as a dipole (without baffle or rear enclosure) at 1 meter for a 2.83V input. It is evident that the superior dispersion uniformity up to 7 kHz will allow the NEO-8 to deliver smooth and balanced sound in a real listening environment. It is necessary to stress that using the NEO-8 as a dipole (without any rear enclosure) may require some signal equalization at lower frequencies, since a dipole exhibits a natural roll-off. In some applications where flat on-axis response is desirable, the use of a correction network at 12 kHz is recommended; in others correction may not be necessary, since spatial averaging will provide smoother power response without the12kHz peak reduction. Line array systems may not need the notch filter due to specifics of acoustical coupling in these systems. The notch filter schematic is given at the end of this document.

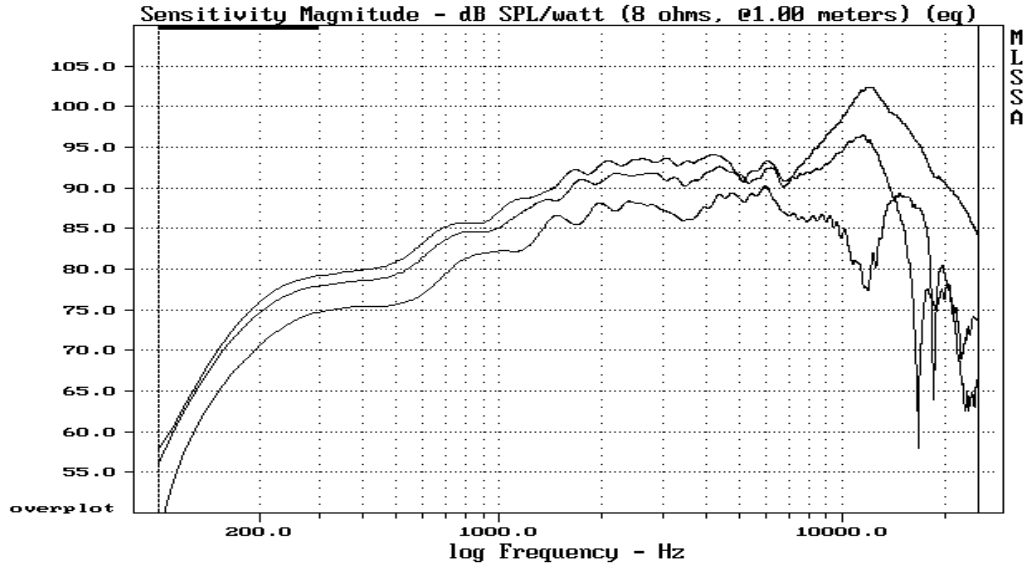


Fig.1 NEO-8 SPL on-axis, 30° off-axis, 60° of-axis

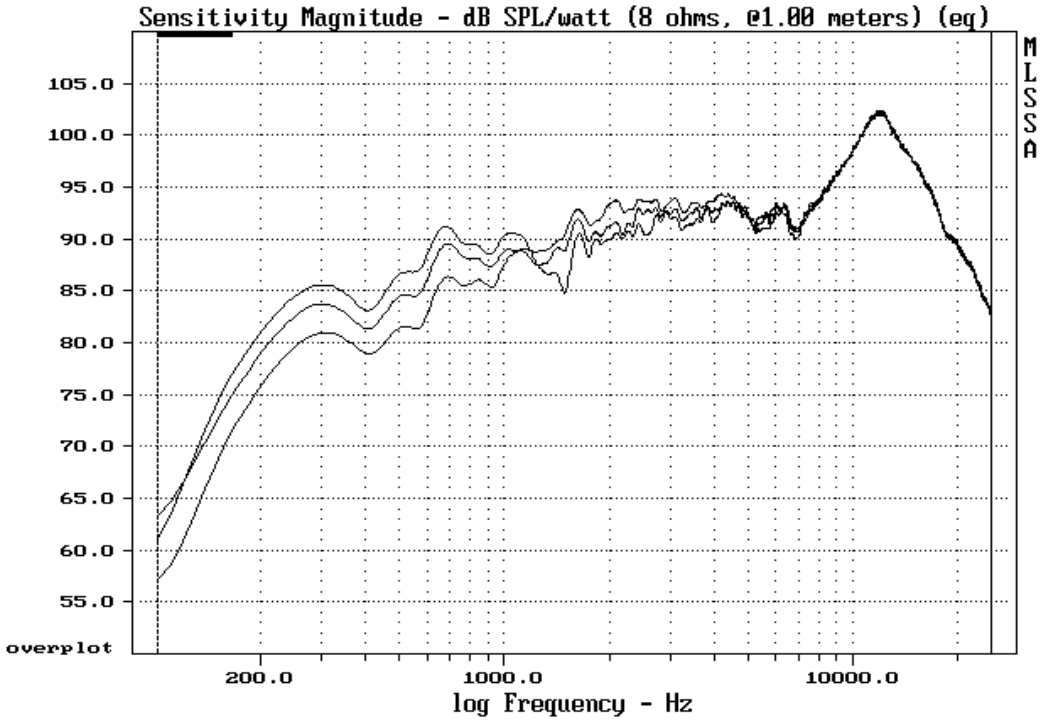


Fig. 2 NEO-8 SPL under different loading conditions

Fig 2. shows the effect of small baffle loading. This condition is close to a typical system or situation when the transducer is a part of matrix panel combining multiple drivers. Top curve – the NEO-8 in the center of 9”x 9” baffle, middle curve - the NEO-8 with 9”x 4.5” baffle from one side, bottom curve – the NEO-8 without a baffle. It is worthwhile to note that a carefully designed rear enclosure provides additional equalization at the low end of the reproduced frequency spectrum.

Fig. 3 shows the Cumulative Decay Spectrum (CDS) plot of the NEO-8. Even the best conventional transducers have decay times in the critical midrange region around 1.5 – 2ms (-20dB level drop) extending to 3-4 ms in lower frequencies. The NEO-8 has a decay time of about 0.5ms across its entire effective range down to human voice fundamental frequencies. The absence of complex mechanical parts, common for a conventional driver, allows the NEO-8 to perform free of delayed spectral contamination. This explains the NEO-8's unsurpassed clarity and the superb intelligibility of voice reproduction.

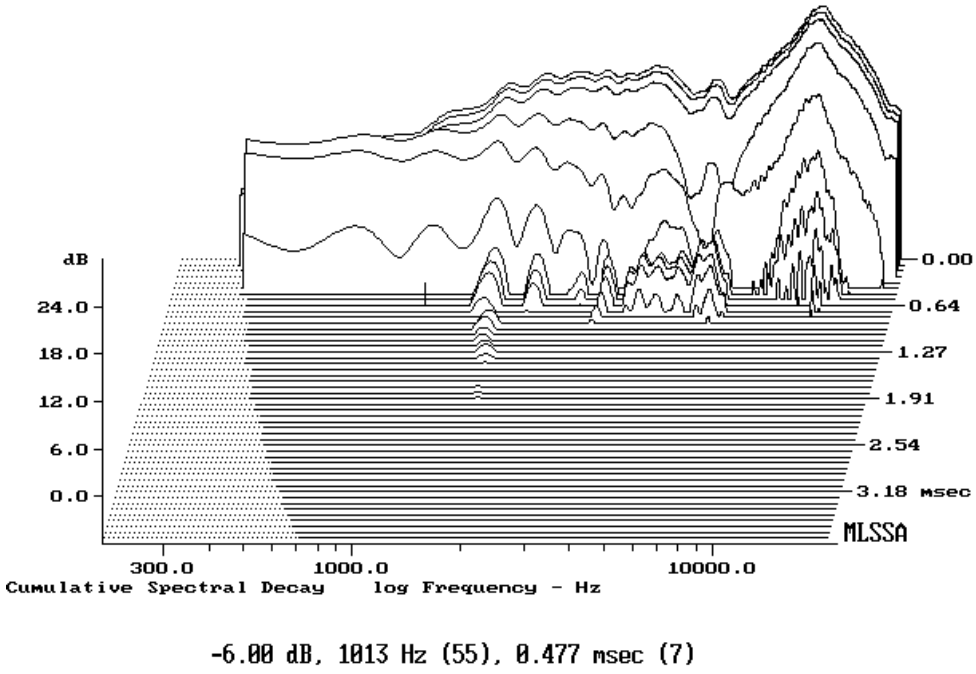


Fig. 3 NEO-8 cumulative decay spectrum

The NEO8PDR is a modification of the Neo8 transducer. It incorporates patent pending PDR (progressive drive and radiation) technology allowing for a significantly wider horizontal dispersion above 8 kHz. The PDR technology provides progressively increasing excitation force from the periphery to the center portion of the diaphragm, while creating frequency dependant acoustic dampening and absorption across the diaphragm. This results in retaining of the efficiency in the effective range while dramatically widening high frequency dispersion. The Neo8PDR has slightly lower sensitivity below 500Hz and above 2 kHz (see Fig.4). However if an application does not require operation extended below 400-500 Hz, but instead calls for a wider horizontal coverage at high frequencies, than Neo8 PDR may be a better choice.

Fig.5 shows a family of on and off-axis frequency response curves of the Neo8 PDR, each one scaled down by –5 dB relatively to the previous curve.

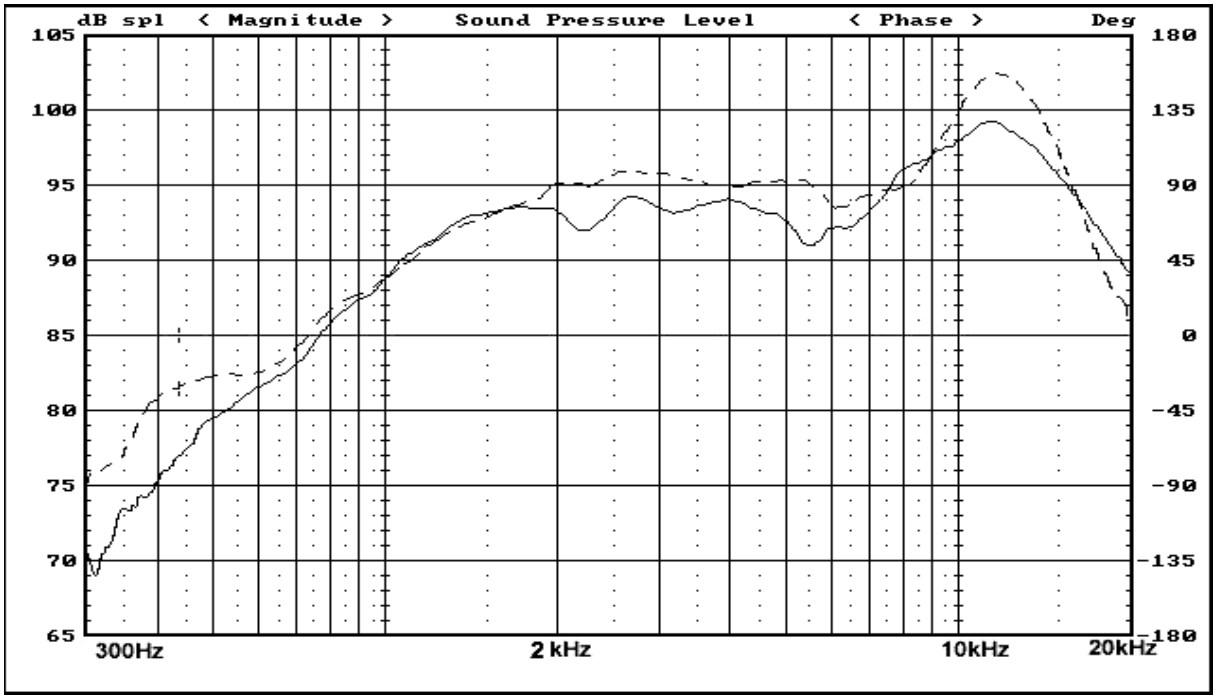


Fig.4 NEO-8 / NEO-8PDR frequency response comparison, 2.83V/1m, no baffle, dipole operation. NEO-8 – dash, NEO-8 PDR – solid.

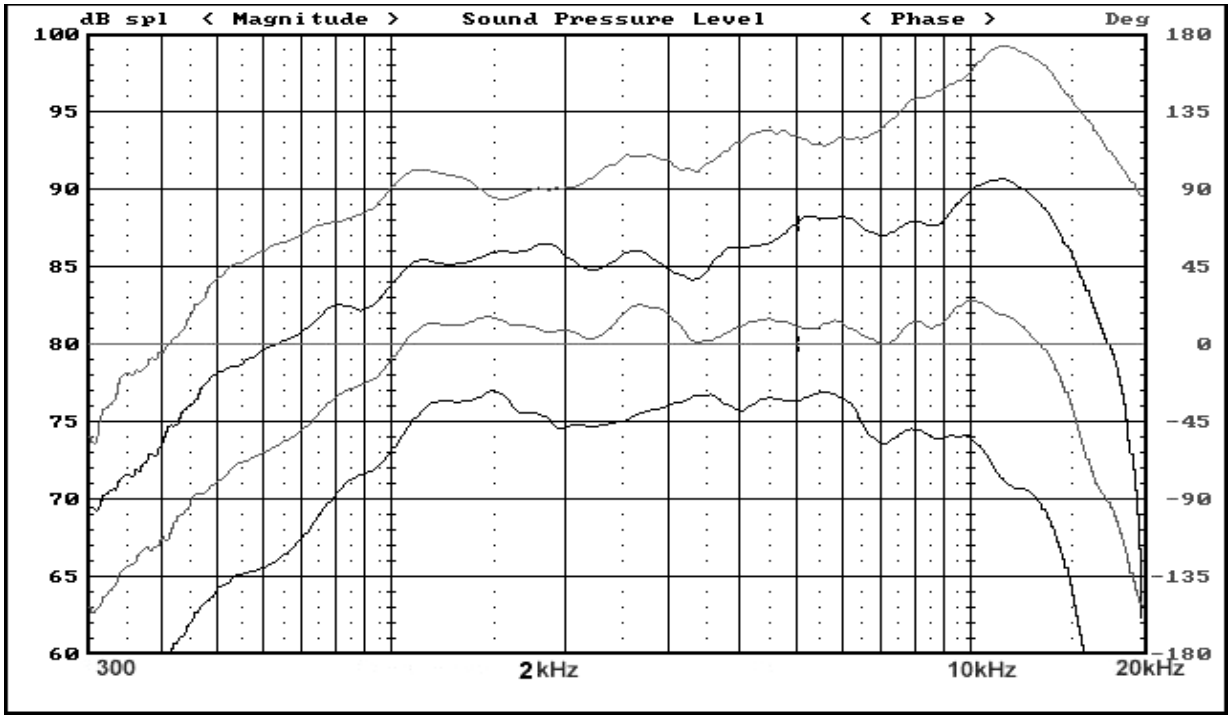


Fig.5 NEO-8PDR frequency response, 2.83V/1m, 12" baffle, dipole operation. From top to bottom: on axis, 30° off-axis (scaled -5dB), 45° off-axis (scaled –10dB), 60° off-axis (scaled –15dB).

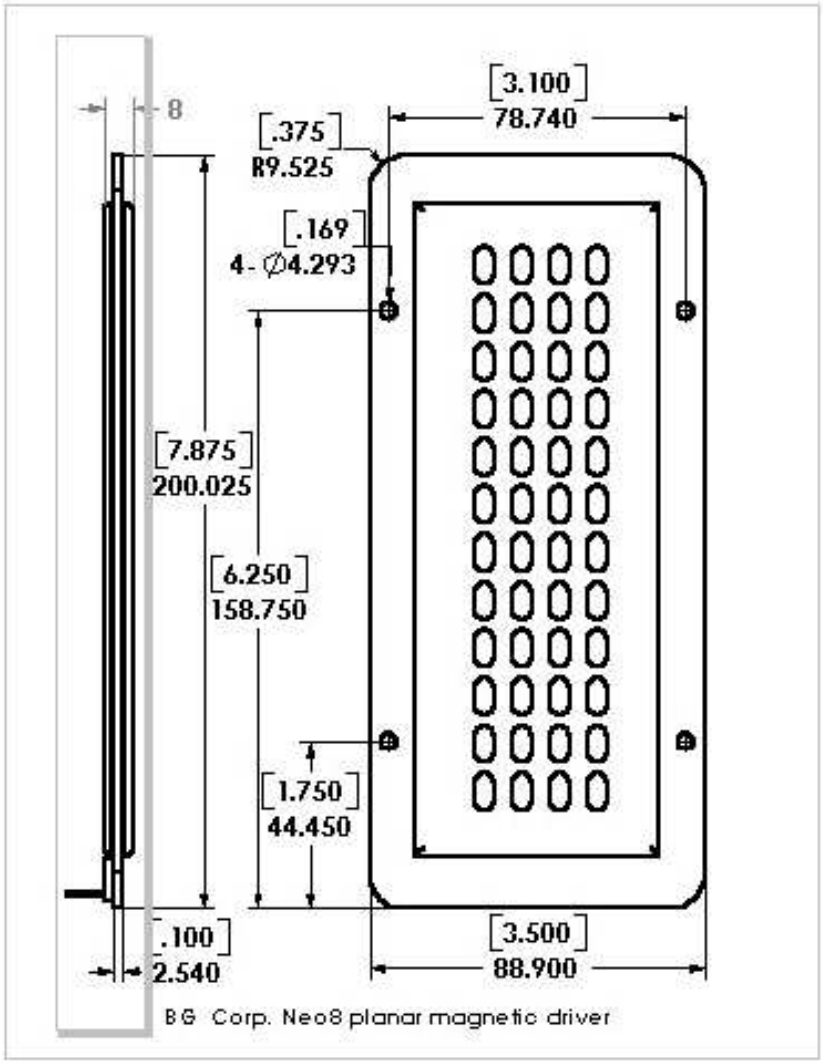
Rear Enclosure Recommendations

The rear enclosure loading effect for the NEO-8 is somewhat similar to regular cone drivers. The NEO-8 can be sued as a dipole with its back opened or as a monopole with its back loaded in a closed box. When the back is closed the NEO-8 LF roll-off is steeper but there is 3-4 dB boost in output from 400 Hz to 800 Hz. When the NEO-8;s are arranged in a line array, the system also gets significant boost below 800 Hz due to constructive interference. Therefore, either dipole configuration or deep rear enclosure is recommended with smooth gradual roll-off to compensate for the lower mid frequency boost.

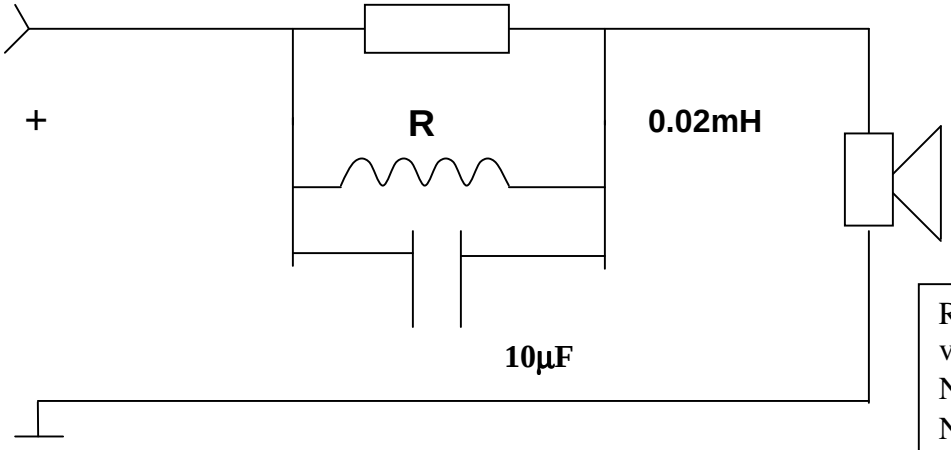
Normally, for monopole operation, we recommend at least a 3" deep (75 mm) rear chamber moderately filled with damping material. Planar drivers are sensitive to back sound radiation and reflections. The more of this that is absorbed the better the resolution. We recommend the rear chamber as deep as 5" (125 mm). In some cases where the crossover point is higher that 600 Hz, the chamber can be as small as 2" (50 mm) in depth. Vertical and horizontal size of the chamber should correspond to the driver size.

Specifications

	NEO-8	**NEO-8 PDR**
Effective frequency range (with EQ & LF)	250Hz to 20kHz	350Hz to 20kHz
Recommended LF crossover, 2nd order min, depends on a system max SPL requirements and acoustic arrangement of transducers		
-- Multimedia and mini systems	220Hz	400Hz
-- Home theater and Hi-Fi	500Hz to 700Hz	500Hz to 700Hz
-- Line arrays	300Hz to 500Hz	350Hz to 500Hz
Horizontal dispersion (monopole, -6dB		
-- Below 2kHz	180º	180º
-- 4kHz	150º	150º
-- 8kHz	85º	120º
-- 10kHz	70º	100º
-- 12.5kHz	50º	80º
Sensitivity, 2.83V / 1m, averaged in 1-8kHz	94dB	92.5dB
Nominal Impedance (3.6 ohms resistive over entire range	4 ohms	4 ohms
Power handling		
-- AES	20W	17W
-- Program	50W	40W
-- Peak	150W	120W
Weight	0.93 lbs / 420 grams	0.84 lbs / 380 grams



Recommended notch filter schematic (not applicable for line arrays)



Recommended **R** value:
Neo8 – 10 Ω
Neo8 PDR - 3.3 Ω

ATTENTION!

When connecting the Neo8/Neo8 PDR drivers, be careful not to overheat the terminals. This can lead to degradation of the diaphragm joint conductivity.

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