The Neo3 PDR – a high performance wideband, wide dispersion planar-magnetic transducer

The Neo3 PDR represents a new breakthrough solution in planar transducer technology from Bohlender Graebener Corporation. Its patent pending innovative PDR design is based on our Neo3 tweeter and stands for Progressive Drive and Radiation technology. Neo3 PDR driver is different from NEO3 though. The NEO3 PDR has strategically arranged magnet system that drives voice coil with a distributed electromagnetic force that resembles the natural shape of the diaphragm displacement at lower frequencies. In addition to that the NEO3 PDR diaphragm has very specific resistive acoustical loading. This is accomplished by locating absorbing material in the very close proximity of the periphery part of the diaphragm. This "contact free" resistive loading, unlike widely used other dampening techniques, does not reduce effective diaphragm size and it does not increase mass of the diaphragm thus allowing to low frequency extension and ultimate signal resolution. The NEO3 PDR design implements a progressive reduction of the radiating area of the diaphragm to a very narrow 15mm slot with increase of frequency providing smoother frequency response and very wide horizontal dispersion even at the highest frequencies. The NEO3 PDR has lower sensitivity than NEO3 model.

The NEO3 PDR uses the same as NEO3 high-tech diaphragm material from Dupont called Kaladex®. This material, combined with a new proprietary technology for etching the aluminum/ Kaladex® 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 Kaladex® has a much higher thermal limit, lower mass, better durability and mechanical stability. As a result, the NEO3 PDR has both higher sensitivity and power handling as well as excellent sound quality. The careful design and unique assembly technology employed by the NEO3 allow for more extended high frequency output, less distortion, and higher dynamic range than with few other planar drivers of similar size.

The NEO3 has 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 Kaladex® 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. There are no heavy voice coils, spiders, glue joints, paper cones and surrounds. Hence there is no cone break-up resonance, distortion, phase incoherency or signal smearing that is common for conventional drivers. With the NEO3 PDR there is virtually nothing between the electrical signal and the sound – just an almost weightless diaphragm. No other commercially available loudspeaker transducer is so pure and so "minimalistic". No wonder the NEO3 PDR delivers clean, airy, transparent sound that is inherently natural and musically pleasing. The purely resistive impedance of the NEO3 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 NEO3 PDR can be used in several configurations. As a monopole in a standard configuration it has a round face plate and a rear cup. As a dipole it can be used with or without faceplate and without rear cup.

Fig.1 shows the frequency response of the NEO3 PDR in a standard version – solid curve

(faceplate and back cup attached)and as a dipole – dashed curve. The frequency responses were measured at 1 meter for a 2.83V input with driver mounted on a small 9"x 22" baffle. SPL is quite smooth with ± 2.5dB tolerance in the 1.8 kHz– 25 kHz range with sensitivity of 93.5 dB/1m/2.83V conservatively averaged in 2 kHz-20 kHz range. This gives a designer a lot of room for response adjustments, potentially resulting in a ± 1.0 dB SPL tolerance within the system. The NEO3PDR is also an excellent choice for high sensitivity speakers designed with tube amplification in mind, studio monitors, as well as various contemporary AV systems with shallow profiles and limited amplifier power where the superior video picture quality demands equally accurate high fidelity sound.

In the same manner as NEO3, the NEO3 PDR can be also optionally shipped as a raw driver without back cup attached and with/without face plate. This version of the NEO3PDR can be arranged as a dipole or semi-dipole with completely or partially opened rear. A choice of different methods absorbing rear radiation could be used as well, allowing the tweeter extended midrange response and any degree of adjusting its radiation pattern from pure dipole to a monopole with totally anechoic rear arrangement. Dipole and a variant with "anechoic" rear enclosure possess ultimate resolution and transparency of sound reproduction although it comes with a lower sensitivity than the NEO3 PDR standard model.

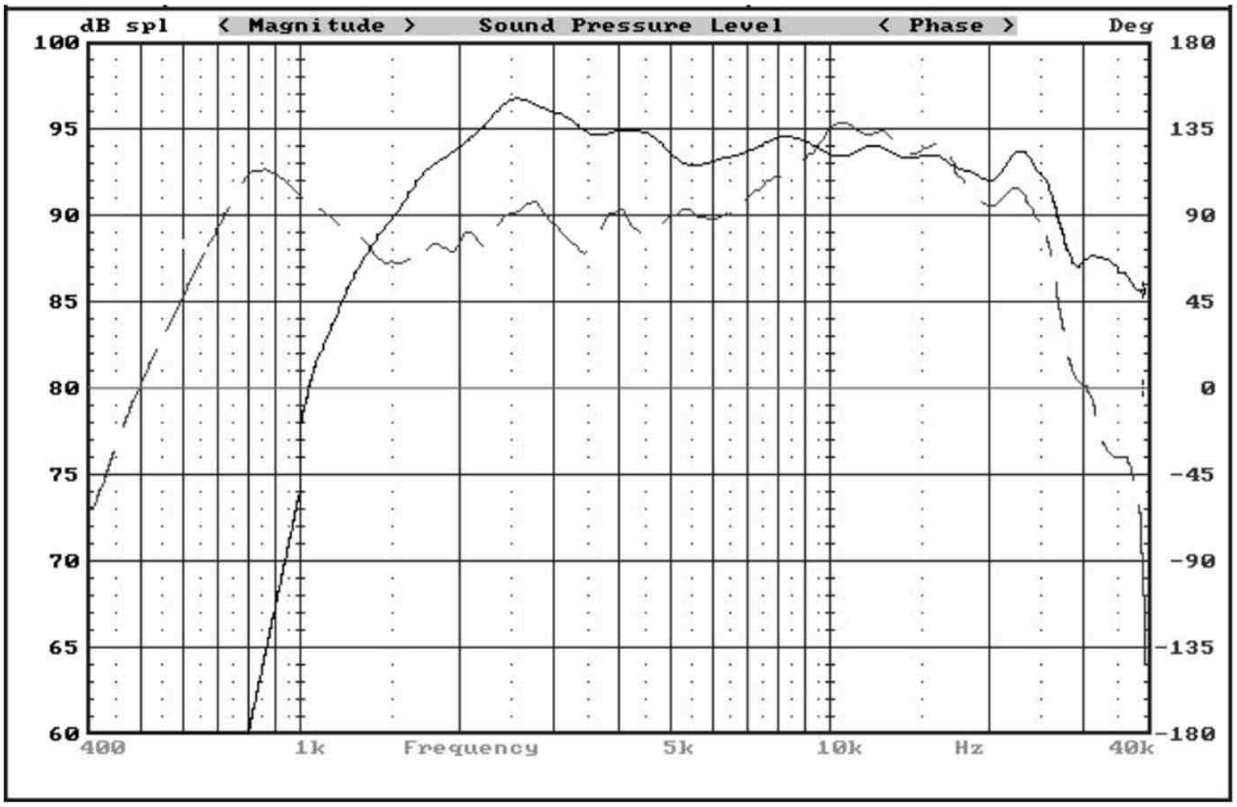


Fig. 1 NEO3PDR on-axis frequency response:
Solid – standard model, dash – dipole in a 9"x22" baffle

Fig.2 shows on-axis and off-axis frequency response curves of standard NEO3 PDR in the same condition as above (0° - upper solid; 15° - dash; 30° - solid/dot).

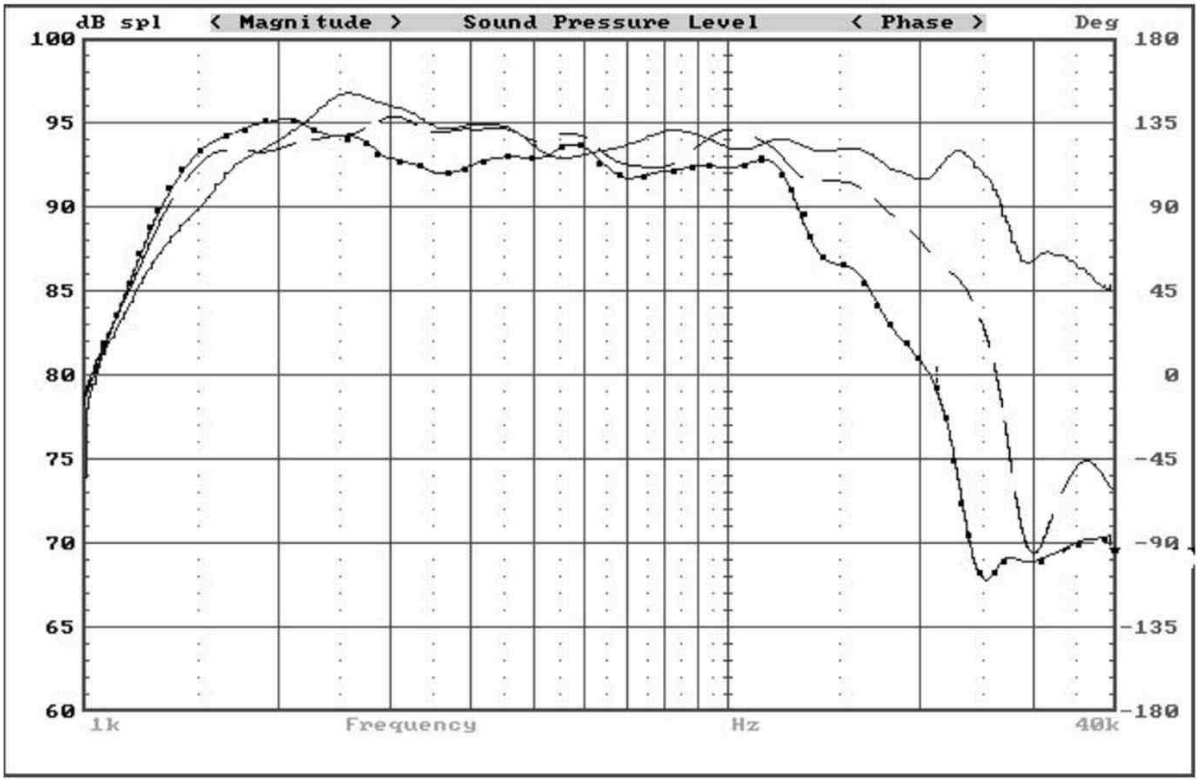


Fig. 2 NEO3 PDR on-axis and off-axis frequency response

Since the smooth 15° off-axis response is largely identical to the on-axis curve, the result is balanced reproduction provided by direct sound. Further 30°off–axis the NEO3 PDR still has amazingly identical response up to 12 kHz and keeping 60° total dispersion angle up to 16 kHz. This allows for ultimate resolution and superior intelligibility within a wider "sweet spot". Being smooth and balanced the extreme off-axis response will provide sufficient space envelopment and a wide soundstage. For a standard single NEO3 PDR with absorbing back cup attached the recommended 2nd order crossover frequency is 2000Hz –2500Hz. If one prefers using first order crossover it is recommended to choose a –3dB cut-off point equal or higher than 3 kHz. The NEO3 PDR can be used in a system with virtually any 6" or even 8" woofer that possesses similar sound accuracy and resolution as the NEO3.

Fig.4 shows the Cumulative Decay Spectrum (CDS) plot of the NEO3 PDR. Even the best conventional tweeters have decay times around 1ms (-30dB decay level) extending to 2-2.5 ms at the lowest frequencies of their effective range. Some heavily doped dome tweeters may have -30dB decay time well under 1ms, but this is only due to a heavy dope dampening. There is no chance for this kind of tweeter to accurately reproduce SACD or 24/96 contemporary recording in its full potential. The NEO3 PDR has a decay time about 0.5ms across most of its effective range extending to 1ms at 2kHz. The absence of complex mechanical parts, common for a conventional driver, allows the NEO3 PDR to perform free of delayed spectral contamination with unsurpassed clarity, accuracy and transparency of sound.

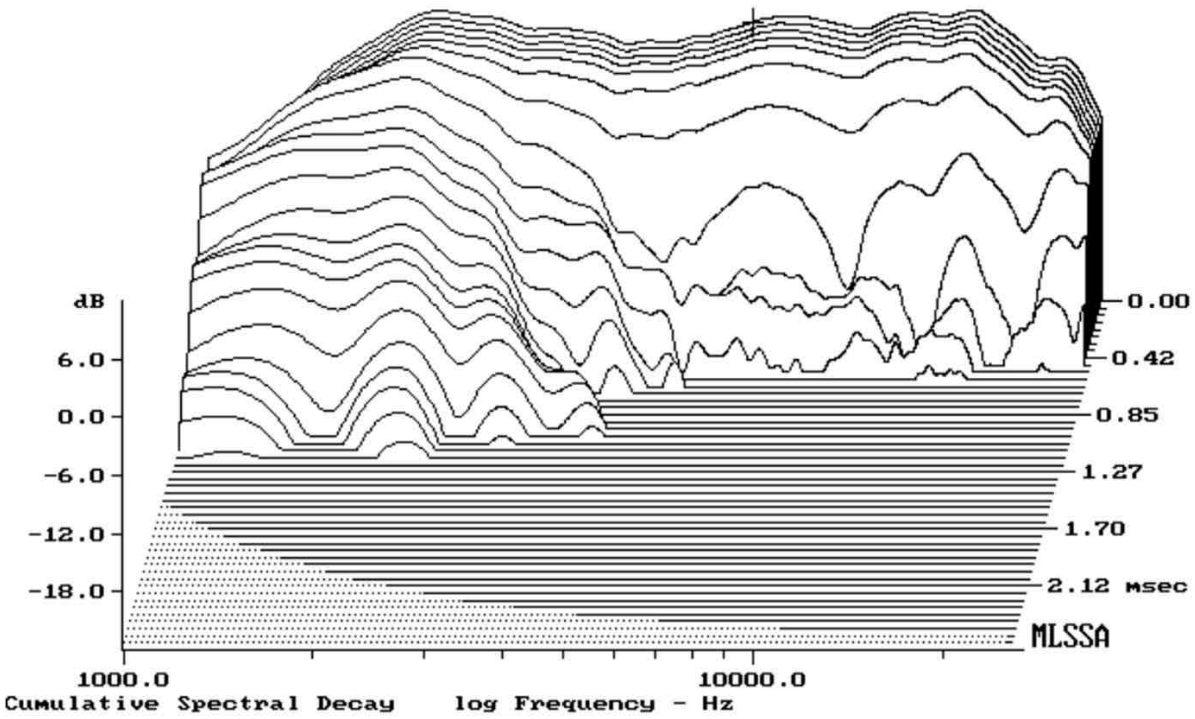
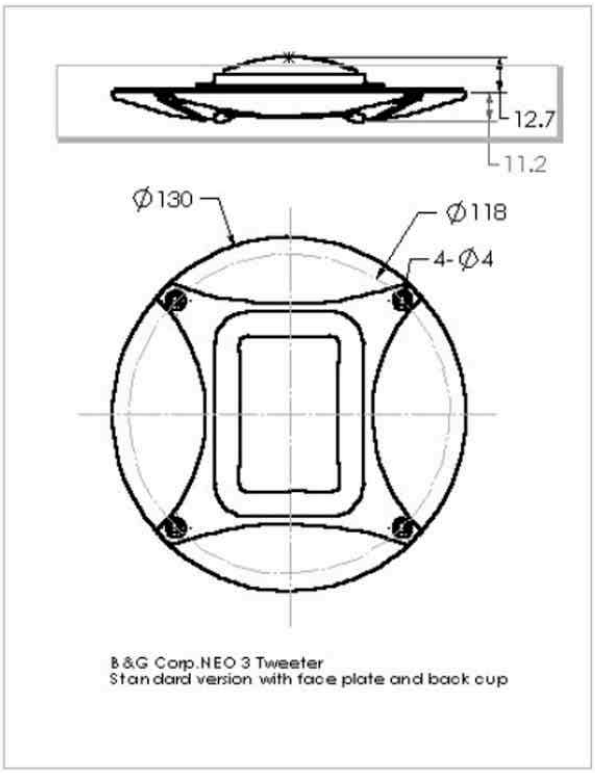
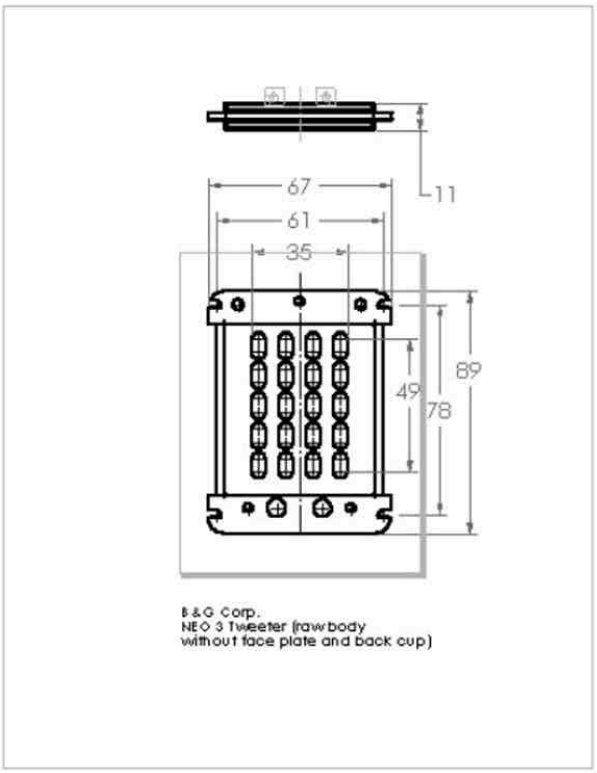


Fig. 2 Neo3PDR Cumulative Spectral Decay (-30dB decay range)

1	Effective frequency range (recommended LF crossover point): Standard version Dipole or with a tuned rear chamber or in an array	 2000 Hz – 28000 Hz 1200 Hz – 26000 Hz
2	Sensitivity (2.83V/1m) Averaged in 2kHz – 20 kHz range Standard version Dipole	 93.5 dB 90.5 dB
3	Impedance (resistive) DCR	4 ohm 3.5 ohm
4	Power handling: RMS Program Peak	 10 W 20 W 50 W
6	Weight	300 g



B&G Corp.NEO 3 Tweeter
Standard version with face plate and back cup



B&G Corp.
NEO 3 Tweeter (raw body
without face plate and back cup)

For more information and technical assistance please contact:
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