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# AEA N22

PHANTOM-POWERED RIBBON MICROPHONE

{ OWNER'S MANUAL }

*Revision 3, July 2015*

# { WELCOME }

Congratulations on your purchase of the AEA N22 phantom-powered ribbon microphone and welcome to the AEA family. The AEA N22 was designed with the singer-songwriter musician in mind. Hard working artists, honing their musical craft for many years, feel strongly about their personal tone, so they need a microphone that translates their signature sound in a recording. Whether you are a musician, home studio owner, or experienced producer/engineer, you will find that the N22 provides a great ribbon tone without the need for EQ in most applications. Most importantly, the N22 was designed by listening first, and measuring only after experienced musicians told us the microphone sounded great. Bridging the gap between vintage and modern, ribbon and condenser, studio and live, the N22 is the perfect companion for musicians and engineers alike.

Your N22 microphone is 100% handcrafted in Pasadena, CA. AEA is a family owned company with a small crew of skilled technicians – most of them being musicians themselves. Proudly independent, we still manufacture all our ribbon microphones and preamps by hand from locally sourced parts.

We hope that the N22 will help you capture many magical performances that touch the heart. Read this manual thoroughly to make sure that you get the best sound and longevity from your new microphone. Please don't be a stranger and become part of the AEA community by sharing your experiences with the N22 via e-mail, phone or our social media channels.

***Wes Dooley***  
*President of AEA*

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## { INTRODUCTION }

The N22 is a side-address, phantom-powered ribbon microphone with a bidirectional (or figure-of-8) pickup pattern. It was designed for close-up miking applications like acoustic and electric guitars, vocals, drums, or piano, but it is also well suited to be used at a distance thanks to its healthy output level. With phantom-powered JFET electronics and a custom German transformer the N22 achieves optimal performance with a wide range of preamps ranging from vintage high-end models to USB or Firewire audio interfaces in home studio setups. The highly protected pure aluminum ribbon allows for using the N22 in live sound applications and vocal recording without the need for an additional pop-filter. The N22 is the first member of AEA's NUVO series. Rooted in the RCA tradition just like other AEA ribbons, all NUVO microphones are designed to offer a fresh approach to the ribbon transducer and represent Wes Dooley's take on the evolution of the ribbon microphone.

## { GENERAL GUIDELINES }

The two sides of the N22 (front and back) are voiced exactly the same, but keep in mind that the backside has opposite polarity compared to the front. Positive polarity is achieved by positioning the side with the "NUVO" logo towards the sound source.

The supplied microphone clip will provide adequate vibration isolation in most situations.

To maintain the best performance from your new AEA N22 microphone, take note of these four basic rules:

- 1) Keep the microphone covered when it is not in use.
- 2) Always use a sturdy microphone stand.
- 3) Never expose the microphone to strong air turbulence.
- 4) Be nice to the microphone, and it will be nice to you.

1) Keeping the microphone covered when it is not in use will reduce the possibility of damage that might result from a sudden gust of air coming from air-conditioning or an open door or window. Place the supplied protective bag (or a standard plastic bag) over the microphone when it is not in use. For longer-term storage, replace the microphone in its protective case.

2) While the N22 was designed to work well with all standard microphone stands, a high-quality boom stand will still make your life a little bit easier. Mounting the microphone on a strong, sturdy microphone stand with a heavy base (or tripod) is essential. If you are using a boom, make sure that it is properly balanced and make sure the tripod legs are positioned appropriately to prevent tipping.

3) Ribbon microphones can withstand very high SPL (sound pressure levels) without difficulty, but can be damaged easily by a sudden, strong gust of air or high levels of low frequency sound waves (like from a kick drum or bass cabinet). This can stretch the ribbon, causing the microphone to lose sensitivity and distort its frequency response. To avoid possible damage, follow this simple procedure when positioning the microphone. Put the back of your hand where the mic will be; if you can feel the motion of air on your hand, place a pop-filter between the microphone and the source of the air turbulence. When recording kick drums or bass guitar cabinets, angle the microphone to make sure that no wind blasts hit the ribbon head-on.

4) Your N22 is a valuable and important investment. Like any piece of recording equipment or musical instrument, it requires common sense and good basic care to keep it working properly. Given simple, basic care as described above, your new microphone will perform admirably for decades.

## { APPLICATION ADVICE }

### *Controlling Leakage*

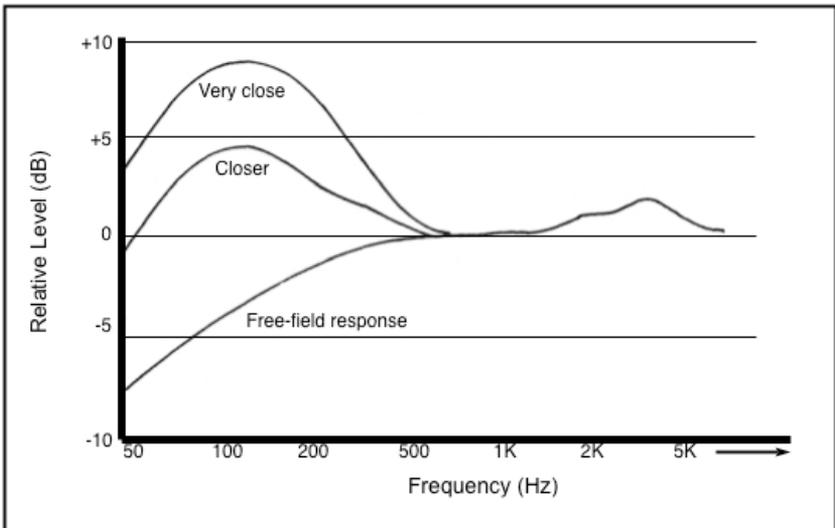
A significant and ever-present challenge in contemporary studio recording is minimizing “bleed” (also called “leakage” or “crosstalk”) from nearby instruments into the various microphones. The deep nulls of bidirectional ribbon microphones provide good rejection of unwanted sounds, which also can be beneficial in sound reinforcement situations where feedback is always a threat. While gobos can be effective in isolating performers from each other, they introduce their own set of problems - not the least of which are reflections in close proximity to the performers and/or microphones that result in comb-filter distortions. Because gobos usually are bulky, they also inhibit the ability of the musicians to hear and see each other easily. Such a setup requires complex and often cumbersome headphone monitor mixes for the musicians.

Because the N22 has a bidirectional pattern, it has nulls at  $90^\circ / 270^\circ$  from the principal (front) axis. Projected in three dimensions, these nulls produce a “plane of rejection” to the sides of the microphone that can be used effectively to reduce leakage. Simply arrange the musicians so that nearby instruments are placed in the “null” of their neighbor’s microphone, and vice versa. Although this does not entirely eliminate the need for gobos, it can significantly reduce their number.

Keep in mind that a certain degree of bleed doesn’t necessarily have to be bad. For some styles and genres it can in fact be beneficial to embrace a little bit of bleed in order to create cohesive and natural sounding recordings. The important thing to listen for is whether or not other instruments that bleed into a specific instrument microphone still sound natural. You will generally find that well-designed ribbon microphones like the N22 capture a natural off-axis sound, which means that bleed from other instruments can contribute to the overall sound in a pleasing way.

### *Proximity Effect*

Proximity effect is a characteristic of all directional microphones; it is a rise in low-frequency response that increases at closer working distances. While this can be used to good effect, particularly with male voices to give them an enhanced richness and depth, the potential trade off is reduced articulation or clarity that can result from the masking effect on the treble due to “excessive” bass boost.



Experienced vocalists instinctively locate the proper working distances for the microphones they are using. From as early as the 1930s, Frank Sinatra always kept one hand on the microphone stand while singing. Some joked that he simply was steadying himself, but more knowledgeable people noticed that he would bring the mic closer for more intimate moments, and then move it farther away when he belted out a line. This technique became known as “working the mic.” A simple technique for maintaining the proper working distance from the microphone is to place a pop-screen between the performer and the microphone. By doing this, nothing need be said to the performers, as they naturally will work at the distance you have established.

Your N22 was designed to exhibit significantly less proximity bass boost than other figure-of-8 ribbon microphones, so that it has a balanced sound at relatively small distances to the sound source. You will find that the N22 works particularly well at similar distances as you would choose for condenser microphones rather than at distances that would be appropriate for traditional ribbon microphones.

### *Application Examples*

Your ears are obviously the best judge of microphone choice and placement, but AEA has garnered a great deal of experience testing the N22 in a variety of recording settings and by talking to experienced musicians and engineers. As a result we suggest the following guidelines to help you achieve optimal results when using the N22. Watch the videos on our website ([www.ribbonmics.com](http://www.ribbonmics.com), [www.aeasessions.com](http://www.aeasessions.com)) and on our YouTube channel ([www.youtube.com/AEARibbonmics](http://www.youtube.com/AEARibbonmics)) for more tips and tricks for our microphones and preamps.

### *Vocals*

Thanks to the improved pop-protection of the N22 you can use the microphone at close distances just like you would choose for a condenser microphone. If you should encounter problems with plosives, it is advised to use a pop-filter.

The microphone has a vertical sweet spot that sits in the middle between the top and bottom edges of the black cloth covered grill basket. When positioning the microphone, choose an appropriate stand or boom setup to accommodate for the height of the vocal talent in order to achieve the best sound. Every singer will move a bit while performing, but since the sweet spot is located in both the horizontal

and vertical axes, it is fairly wide and forgiving.

If you are recording a musician who sings and plays an instrument at the same time, you can make use of the exceptional rejection offered by the 90° “null” planes of the bidirectional pickup pattern to reduce the pickup of the instrument in the vocal microphone.

### *Acoustic Guitar*

When recording a solo guitar a good starting point is to position the N22 four to six inches (10-15 cm) away from the guitar roughly pointing at the 12th fret or where the neck meets the body. The closer you move towards the sound hole, the more bass you will get.

Again, if you are recording a singer-songwriter who sings and play another instruments at the same time, you can make use of the exceptional rejection offered by the 90 degree “null” planes of the bidirectional pickup pattern to reject the vocal in the guitar microphone.

### *Electric Guitar & Bass*

The N22 can handle very high sound pressure levels and has improved wind protection, so it can absolutely handle loud electric and bass guitars right on the grill of the amp. Identify where the center of the speaker cone is located and place the N22 a few inches (5-10 cm) away from the speaker pointing right at its center for a very direct, “in-your-face” sound. This is the spot that will obtain the most high-frequency content. If it sounds too harsh, try moving the microphone slightly off center of the speaker cone. You can also try positioning the N22 at an angle. You will find that small differences in positioning can make huge differences in the sound, so experiment until you find the spot you like.

When using multiple microphones on a cabinet at once and mixing them to create a particular sound, it is important to pay attention to the phase relationship between the different signals. Try to position the different microphones as close to each other as possible, to avoid phase problems caused by sound arriving at the microphones at slightly different path lengths. Make sure to listen to the combined signal summed to mono to catch potential comb filtering that could be caused by out-of-phase signals. If you are recording with the back lobe of the N22, it is important to invert the polarity on the preamp or DAW.

For a more natural sound that captures the sound of the amp in your

room, try backing the microphone up a couple of feet.

## *Drums*

Although the N22 may work well for traditional ribbon mic placement techniques like overheads or room mics, it is particularly well-suited for more close-up applications like drum underheads, kick or snare. On snare drum, the N22 really brings some character to the table that will be hard to find in an SM57. Use the null plane of the figure-of-8 to reject the hihat. If you have a drummer that plays very well balanced (*yes, this might be rare*), position the N22 so that its back side picks up the hihat as well.

## { PRECAUTIONS }

Most ribbon microphones need little, if any, maintenance. Given proper care they last for decades. Bing Crosby's personal RCA-44BX (now in the collection of the Pacific Pioneer Broadcasters in Hollywood) sounds as good today as it did when he recorded his radio broadcasts in the 1940s.

A few simple precautions will help you to keep your AEA N22 working well for life.

## *Phantom Power*

Although the N22 needs a standard 48V phantom-power source to operate, you should still make sure that phantom-powered is turned off before plugging and unplugging the microphones. The loud pops that occur when the microphone is plugged in with phantom-power engaged can damage speakers, headphones, and ears. Since passive ribbon microphones or other transformer-coupled microphones are particularly sensitive to phantom-power, it is recommended to make disengaging phantom-power before plugging and unplugging a habit.

## *Wind Gusts*

A second and equally important rule is never to blow directly into a ribbon microphone to test it. Strong air turbulence can stretch the ribbon diaphragm and while it may not break, it will nonetheless significantly degrade the microphone's performance. The ribbon in the N22 is highly protected by multi-layered screens and cloths to provide

superior wind protection compared to many other ribbon microphones so that the microphone can be used for recording vocals without the need for a pop-filter. Nonetheless, using it outdoors requires special care to avoid wind which can damage the ribbon. Indoors, however, it is also important to avoid serious air movement from stage curtains, open windows, doors, or air-conditioning systems. Use the supplied cloth bag to cover the microphone whenever it is not in use. High SPL sound sources do not usually pose a problem because most ribbon microphones can handle 130 dB SPL or more without difficulty. It is only those “explosive” sources that produce a strong blast of air, such as the bass port on an electric guitar or bass amp, a guitar being plugged (or unplugged) while the amp level is turned fully up, an on-axis kick-drum (particularly with a port on the front head), that are potentially damaging. If you are unsure about how much wind is hitting the microphone, place the back of your hand where the microphone is going to be. If you can feel significant wind blasts, angle the microphone or use a pop screen to avoid direct hits.

### ***Tramp Iron***

Minute iron particles, sometimes known as “tramp iron,” are common within our environment. AEA ribbon microphones contain powerful magnets that produce strong magnetic fields. These fields can attract any ferric metal near the microphone that, if they are small enough, can penetrate the outer screening and work their way inside the microphone. Over time, this “tramp iron” can build up sufficiently in the magnetic gap to rub against the ribbon causing distortion, electrical shorts or tearing of the ribbon. The best prevention is to keep the microphone covered with the supplied plastic bag when it is not in use.

Under no circumstances should you disassemble and take the grill off of the microphone as this could allow tramp iron to enter the narrow gap between the ribbon and the pole pieces. Disassembling the microphone will VOID your warranty.

### ***Microphone Positioning***

The shock-mounted clip that is supplied with the N22 microphone was designed to keep structure-borne noise transmitted through the microphone stand away from the low-tuned ribbon transducer. For the shock mount to function as intended and to avoid vibration entering the microphone through its attached cable, it is important to tie the microphone cable to the microphone stand in a loop with a cable tie, shoelace or string.

## *Magnetic Stray Fields*

Ribbon microphones are fundamentally prone to picking up strong external magnetic fields caused by light dimmers or nearby power transformers. Guitar players will know this phenomenon from single-coil pickups. Even though much attention was paid to suppressing such sensitivity to external magnetic fields in the design of the N22, it is still possible that you might encounter this problem. If you should pick up a hum, try rotating or moving the microphone to find a spot where the hum disappears, and try eliminating potential sources of stray magnetic fields. You can use the microphone to find where hum is originating. Rotate the mic for maximum interference and move it back and forth to sense its direction.

The high-performance magnets used in the KU4 and R44 are incredibly strong, and a significant amount of stray magnetic field lines surround the microphone. Avoid placing the microphone in close proximity to hard drives, credit cards, analog tape, or any other magnetically sensitive items to prevent any data loss. These classic ribbon mics were designed for maximum performance in professional environments with well-trained technicians.

# { SPECIFICATIONS }

Operating Principle: Pressure gradient transducer  
 Directional Pattern: Bidirectional  
 Frequency Range: <20 Hz to >20 kHz  
 Maximum SPL: 141 dB SPL (1% third harmonic > 1 kHz)  
 Sensitivity: 6.2 mV/Pa (at 1 kHz, no load)  
 Output Impedance: 92  $\Omega$  broadband  
 Recommended Load Impedance: 1.0 k $\Omega$  or greater  
 Phantom power: P48 phantom power, 7 mA  
 Polarity: Pin 2 high for positive pressure at the front of the microphone.

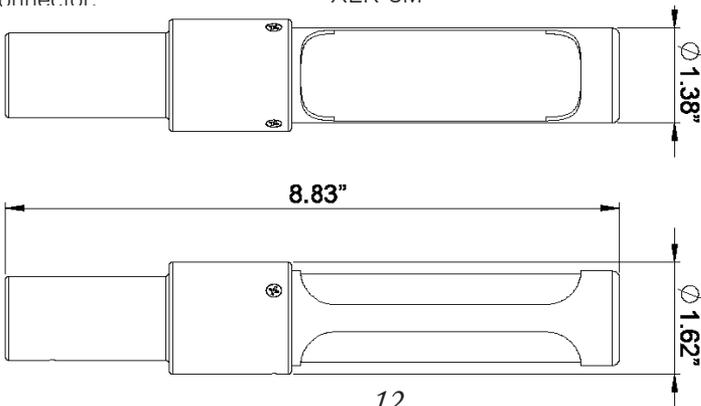
**Polar Response:** Native bidirectional, figure-of-8 pattern  
 Horizontal: Up to 90 dB rejection at right angles to the front/back axis.  
 Vertical: Level changes with angle of incidence, but frequency response is consistent.

## Transducer Element

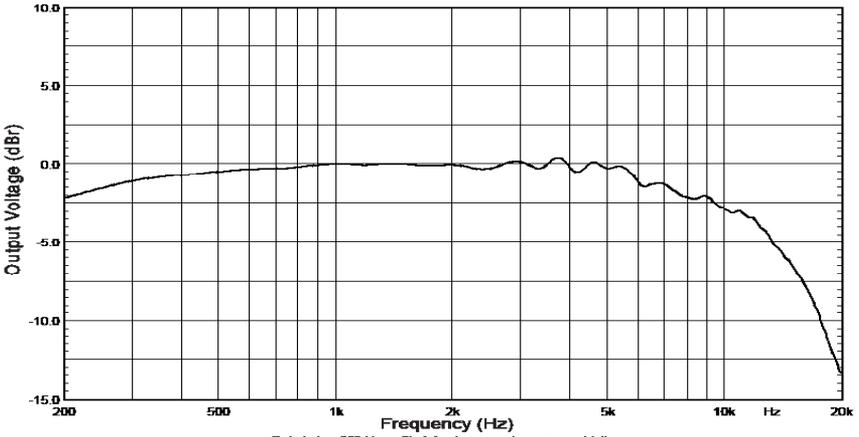
Material: Pure aluminum corrugated ribbon  
 Thickness: 1.8  $\mu$ m  
 Width: 0.185 in (4.7 mm)  
 Length: 2.35 in (59.7 mm)

## Microphone Dimensions:

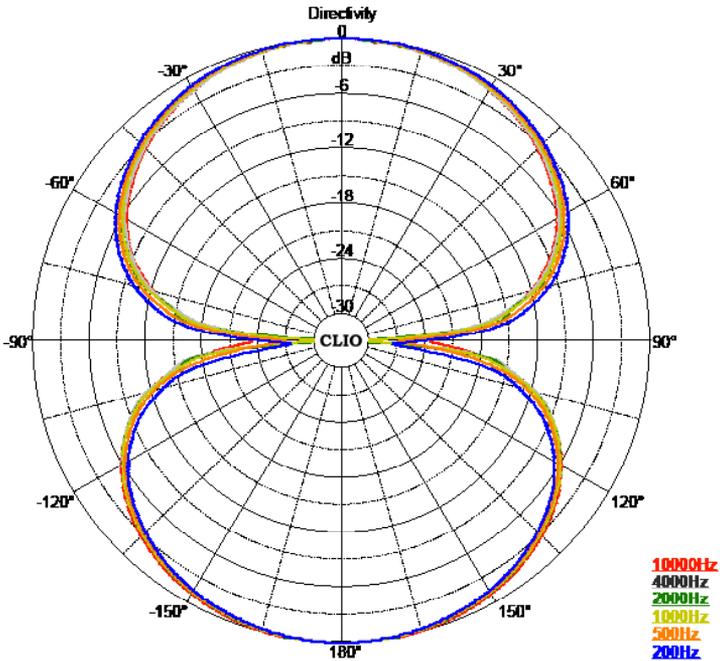
Height: 8.83 in (32.4 cm)  
 Width: 1.62 in (11.7 cm)  
 Depth: 1.62 in (9.5 cm)  
 Weight: 12 oz (335 g)  
 Shipping weight: 1 lb 13 oz (810 g)  
 Connector: XLR-3M



### AEA N22 Frequency Response



Data below 200 Hz omitted due to measuring room restrictions.  
0 dB is equivalent to 6.2 mV/Pa at 1 kHz.  
Normalized to 0 dB at 1 kHz.



### Accessories Included:

Storage/shipping case, microphone stand clip,  
custom protective mic sleeve, user manual

## { WARRANTY }

Your N22 microphone comes with a one-year limited warranty on parts and labor, shipping not included. Please see the supplied warranty card for details.

Registering your microphone with AEA will extend the warranty to a full three years. Simply fill out the supplied registration form and send it to:

Audio Engineering Associates  
1029 N. Allen Ave  
Pasadena, CA 91104

You may also register your AEA equipment online at <http://www.ribbonmics.com/aea/form.php>

## { SUPPORT }

If you should encounter any problems with your microphone or if you have questions regarding using the N22 in specific application, please contact our customer support team at [support@ribbonmics.com](mailto:support@ribbonmics.com)

To talk to a live human being, call +1 (626) 798-9128, between 8:00 a.m.- 6:00 p.m. PT Monday through Friday.

There are a number of audio and video recordings of various AEA microphones online. Please visit [www.ribbonmics.com](http://www.ribbonmics.com)