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MICROPHONE FACTS

for the operating engineer

from *Electro-Voice*®

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ANNOUNCING THE MODEL RE15 SUPER-CARDIOID VARIABLE-D™ MICROPHONE

Many of you have heard something about it. Some have seen it and heard tapes produced with it. A few have had the opportunity to use it on productions, but the four pictured below were there in the beginning. This is the audio team responsible for the field evaluation of the RE15. John Neal, however, was the one most directly involved in the choice of frequency response, polar pattern, and other features that combined to make it a standout in the field.



Bob Crawford
Chief Utility

Eric Reed
Chief Boom Operator

Gene Lukowski
Technical Director

John Neal
Audio Engineer

In November of 1965, the first trial model of the RE15 was mounted on a boom at the ABC Hollywood Palace Theater. By February of 1966, the first complete prototype replaced the original model. Since that time the RE15 has been the only microphone used for this purpose. In November of 1966, the first production type RE15 replaced the prototype. Following is the story of the development of the now famous RE15.

By September 1965, all makes and models of boom type microphones considered of consequence had been tried on the boom at Hollywood Palace. All had missed solving some troublesome problems. I was with John Neal shortly after he had reached the end of what microphones there were to try. He was still looking for more level before feedback, smoother response, and most of all a uniform polar response that would eliminate the degrading of sound picked up at the side and rear of the microphone.

Since John had already tested everything he felt was worthwhile, a microphone that would solve his problems presented a real challenge. It would be the greatest step forward in years.

Before my discussion with John, work had already begun in our lab on a new Variable-D microphone incorporating several things we had learned during the years of producing the Variable-D model 666*. The new unit fortunately contained several of the characteristics required to solve John's problems.

* U.S. Patent No. 3,115,207

Frequency Response

Originally five prototypes were supplied for test, each having different frequency response characteristics. The two most extreme variations were almost immediately discarded. The remaining three were tested for several weeks before it was decided the curve shown in Figure 2 of the enclosed model RE15 specification sheet was preferred for both boom and orchestra use.

Polar Response

One of the serious problems at Hollywood Palace was the off-mike pickup of orchestra on the boom microphone which in all instances was facing away from the orchestra. This leakage would not have been a problem had the polar response of the microphone been uniform at all frequencies. Uniform response would have prevented the off-mike pickup from becoming degraded.

Here is an example of what was happening: a vocalist was to be picked up from the stage but, because of the wide-angle picture, working distance had to be increased from the usual three feet to around six feet. This meant the gain had to be doubled to maintain satisfactory voice level. This increase in level meant proportionally greater pickup of the off-mike orchestra. Reducing gain of the orchestra microphones helped control the overall level but also allowed the vocal microphone to become the dominant factor in orchestra pickup and this

off-mike pickup was seriously degraded. With some microphones, the high-frequency response suffered, causing the sound to be dull or tubby. With others the midrange was missing or full of peaks.

This was the big challenge: to design a microphone with the same frequency response at front, sides, and back; a microphone that would drop in level only, at the sides and rear.

A relatively uniform polar response in an otherwise satisfactory microphone was found to be unavailable until the RE15 was developed. Refer to Figures 2 and 3 on the RE15 specification sheet showing polar response.

IT HAPPENED AT A MAJOR MOTION PICTURE STUDIO

A few months ago I handed a pair of RE15's to the chief of sound of a major motion picture studio** and said, "These units have something you have been looking for for years--uniform polar response, no change in response, only a drop in level as you walk around the microphone."

**Name withheld by request

A few weeks later I had occasion to talk to him again, and during the conversation, he said, "I think you will be interested in the test we made of the RE15's you left with us. We have never had any reason to doubt you, but when you made the statement regarding the uniform polar response of the RE15, we found it hard to believe so we proceeded to make a test of them. The two mikes were placed side by side on stands on a scoring stage, and one of the boys stood in front of them and talked. One RE15 remained facing him while the other was rotated. AB comparisons were made at many fixed positions from front on around to back and at every position, after the gain had been balanced, we found the response to be equal. Both were sent out on location and are doing an excellent job."

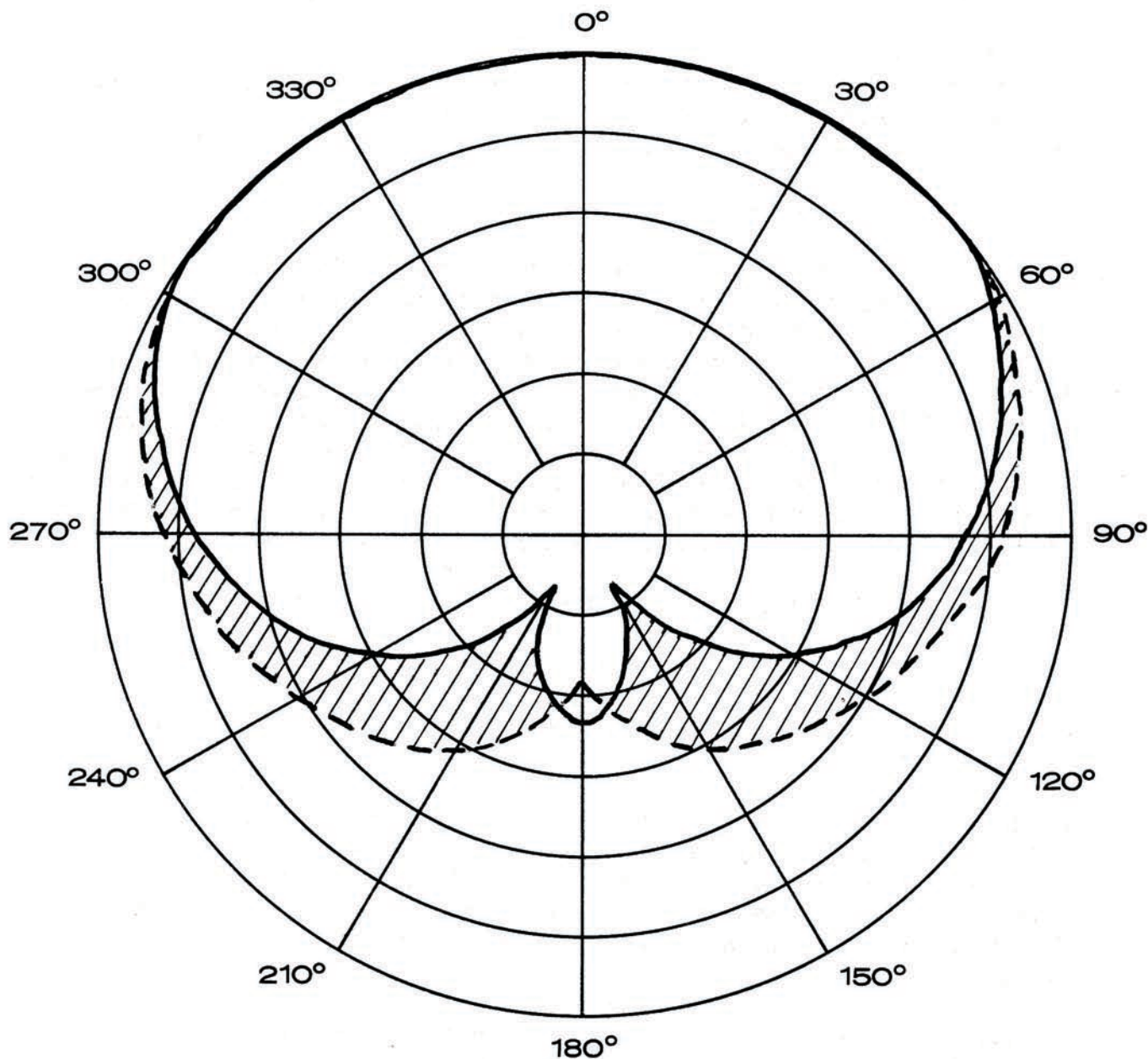
THE BENEFITS OF A SUPER-CARDIOID POLAR PATTERN

In an effort to reduce the level of off-mike pickup and thus increase working distance, many variations in the shape of the polar curve were investigated. Beginning with pure cardioid, the pattern was varied until we arrived at the response shown below.

The dotted line indicates a pure cardioid pattern, the solid line the polar pattern of the RE15. The shaded area shows the amount of improvement of reduction in pickup at the rear region gained by tailoring the polar pattern to be slightly bidirectional. By allowing a loss of 2 db at 180° much has been gained in the rest of the rear region and with only a slight narrowing of the angle of acceptance at the front.

This super-cardioid polar response in conjunction with smooth, peak-free axial response has greatly increased the working distance of the RE15. When comparing it with a typical well-designed normal cardioid unit, you will find the RE15

can be used at 50% greater working distance. In actual comparison with the E-V model 642 Cardiline microphone at distances between 4 and 5 feet, the RE15 was found to be its equal from the standpoint of rejection of unwanted sound. For greater distances, of course, the 642 was the winner without a doubt. Here the much narrower angle of acceptance produced a cleaner pickup. If you have been using the 642 at distances of 4 feet and under, I am sure you will find the RE15 a better tool for working in close.



SCALE IS 5 DECIBELS PER DIVISION

Variable Low-Frequency Response

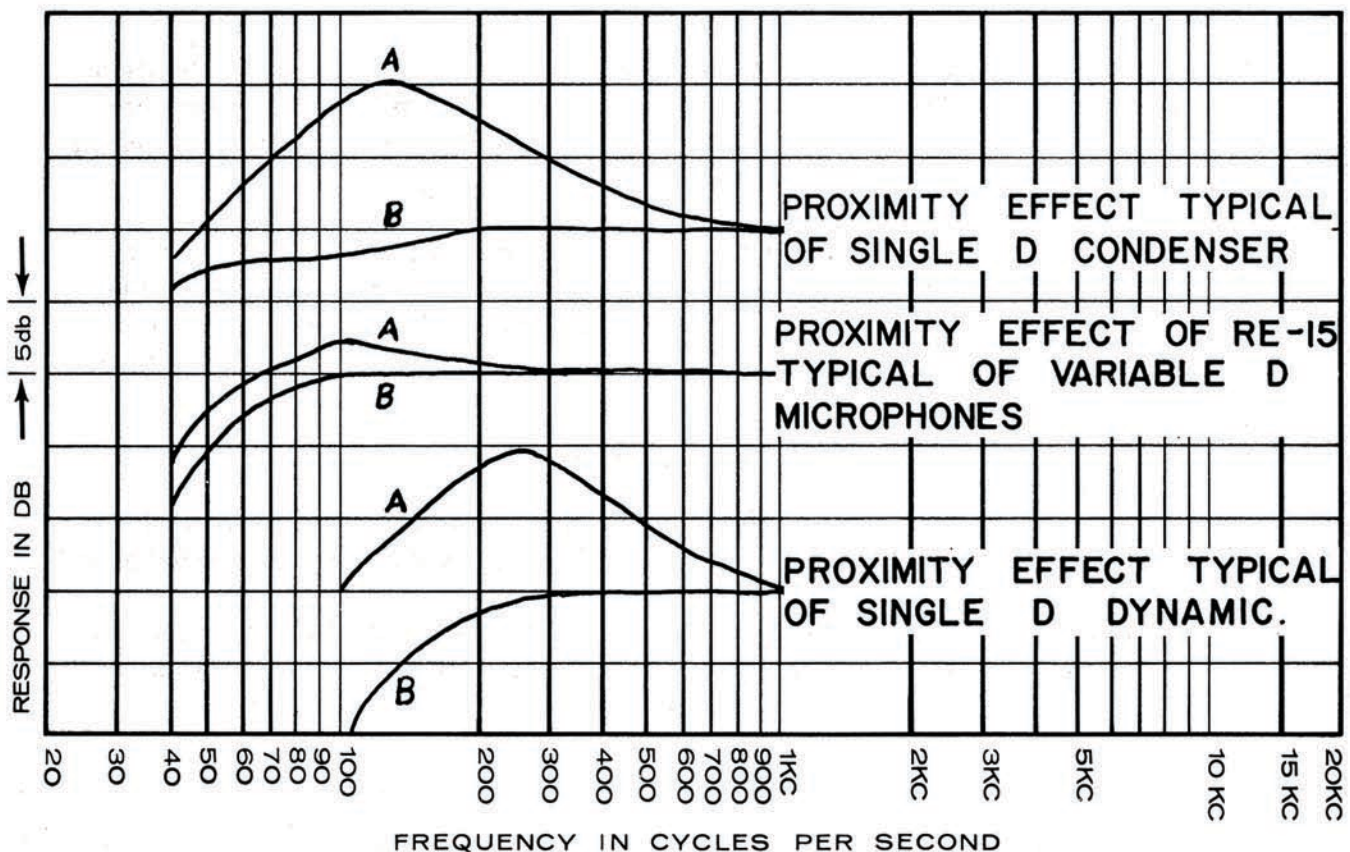
The RE15 employs a switch to alter the low frequency response to be similar to that of the 666 and 666R. For pickup distances in excess of six feet, where the room has a low frequency rumble problem, the roll-off position will be found useful. It has also been found useful in cleaning of low frequency problems associated with small announce studios.

Proximity Effect

Proximity effect is the bassy or boomy effect you hear when a microphone is used close to the lips and the thinning out you hear when it is used a foot or more away. There is no noticeable effect with the RE15 Variable-D microphone. This cannot be claimed for any other make or type of microphone. Only the patented principles inherent in Electro-Voice Variable-D microphones effectively eliminate it.

A - FREQUENCY RESPONSE AT 6" WORKING DISTANCE

B - FREQUENCY RESPONSE AT 24" WORKING DISTANCE



Compare the frequency-response curves of the Variable-D RE15 shown above, graph B, and that of two microphones employing the single-D principle. The low-frequency response of the RE15 shows very little change with distance, while that of the single-D units show a great change. Lack of proximity effect in the Variable-D model 666 is one of the features that contributed greatly to its popularity and it is doing the same for the RE15.

No Overload Distortion

Distortion due to microphone overload is just not possible with the RE15 or any other E-V professional microphone. It will faithfully reproduce sounds far in excess of anything your amplifier can handle. Work it right inside the bell of a trumpet or in close proximity to any other instrument, and what comes out of the RE15 to feed your amplifier will be clean, undistorted signal. Manufacturers of condenser and ribbon microphones cannot honestly make this statement.

What About Mechanical Damage ?

Like all E-V professional microphones, the RE15 can take it. Each RE15 receives the equivalent of six free drops onto hardwood from a height of four feet before its final test. When they leave the plant, we know each and every one can take it. We are determined you are not going to end up with a damaged microphone the first time you happen to drop it.

Comparing the 666 and RE15

The model 666 has taught us many things, and as a result, the RE15 is actually a much improved 666. In comparing the two, you will find the RE15 has smoother response, higher level, improved uniformity and stability, lighter weight, smaller size, and best of all, uniform polar response.

We feel that you as a 666 or 666R user will want to switch to the RE15 once you have compared them. We do, however, intend continuing to manufacture the 666 and 666R, they have been too popular for too many years to suddenly drop. We will continue their manufacture until such time it becomes uneconomical to do so.

Are You One of Those Who Have Not Heard?

There must be many that have not taken the time to read the E-V professional microphone warranty, at least I have talked to several recently that had no knowledge of it.

After reading the warranty, I had one person say, "This is fantastic, you must be out of your minds or are actually building the finest, most rugged mikes in the world to be able to back them with this warranty."

Warranty

The Model RE15, like all E-V professional microphones, is guaranteed unconditionally