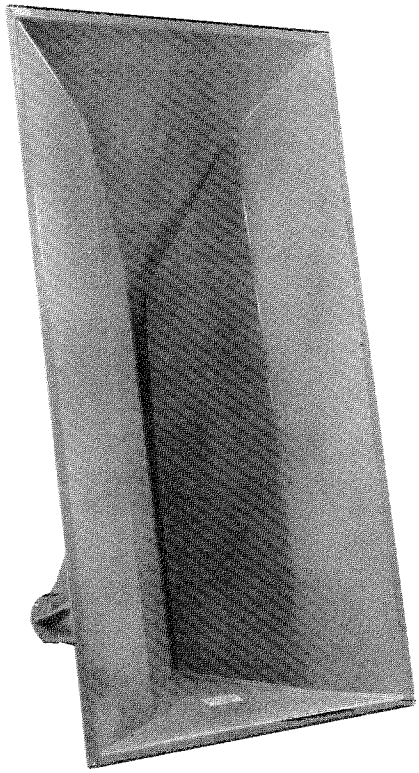
NOW THERE'S NOT A BAD SEAT IN THE HOUSE!



VIR - An Audio Engineering Breakthrough!

- **PROVIDES FRONT TO BACK SPL UNIFORMITY OVER ENTIRE SEATING AREAS**
- **ANGULAR CORRECTION FOR TRUE RECTANGULAR FLOOR ISOBARS**
- **REDUCES SIZE, COMPONENT COUNT, AND COST OF CLUSTERS**
- **MANTARAY® HORN BELL FOR SHARP EDGE ROLL OFF**
- **SINGLE HORN COVERAGE OF ENTIRE ROOMS!**
- **APPLICABLE TO MOST ROOM SIZES**

APPLICATIONS

- Auditoriums
- Houses of Worship
- Arenas
- Stadiums

ALTEC LANSING®

Vari Intense™

SPECIFICATIONS FOR THE VIR VARI INTENSE™ HORN

Horizontal Dispersion Angle,
Long Throw: 60° (+32°, -6°) 800 Hz to 16 kHz (See Figure 8)
Short Throw: 90° (+8°, -11°) 500 Hz to 16 kHz (See Figure 8)

Vertical Dispersion Angle 60° (Nominal Coverage) 500 Hz to 16 kHz (See Figure 5)

Mean Directivity (Q): 14.8 (+18, -10.4) Reference Axis, 500 Hz to 16 kHz (See Figure 9)

Mean Directivity Index (DI): 11.7 dB (+4 dB, -4.8 dB) Reference Axis, 500 Hz to 16 kHz (See Figure 9)

Useable Low Frequency Limit: 400 Hz (See Figures 1, 2)

Frequency Response: 400 Hz - 16 kHz (See Figures 1, 2)

Pressure Sensitivity: dB SPL, 500 Hz to 3.15 kHz (See Note 1)

Driver	Input Power	1 Meter	4 Feet
288-L	1 watt	112	110
	20 watts	125	123
290-L	1 watt	110	108
	120 watts	130	128
291-L	1 watt	111	109
	50 watts	127	125
299-A	1 watt	112	110
	50 watts	128	126
906-A	1 watt	112	110
	40 watts	127	125

Construction: Polyester resin and fiberglass with integral die cast zinc throat and dampening panels

Finish: Polyester gelcoat gray

Dimensions: 32.0 in. (81.3 cm) wide
60.0 in. (152.4 cm) high
35.0 in (88.9 cm) deep

Net Weight: 47 lb. (21.4 kg)

Shipping Weight: 61 lb. (27.7 kg)

Driver Mounting Data: Four .406 in. (1.03 cm) holes on a 4.75 in. (12.07 cm) diameter bolt circle

Recommended Drivers: Altec Lansing 288-L types
290-L types
291-L types
299-A types
906-A types

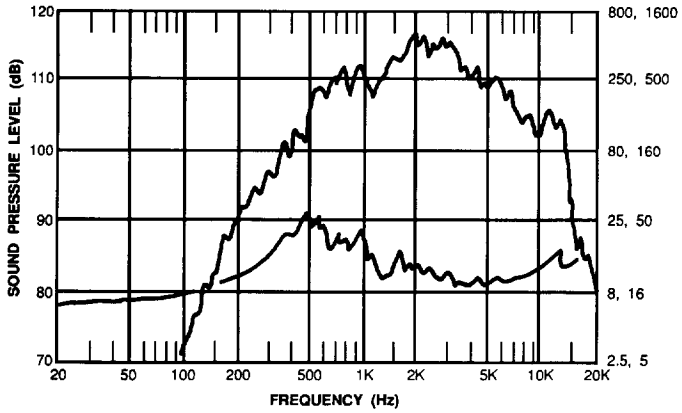


Figure 1. Frequency Response and Magnitude of Impedance with 299-A Driver (See Note 2)

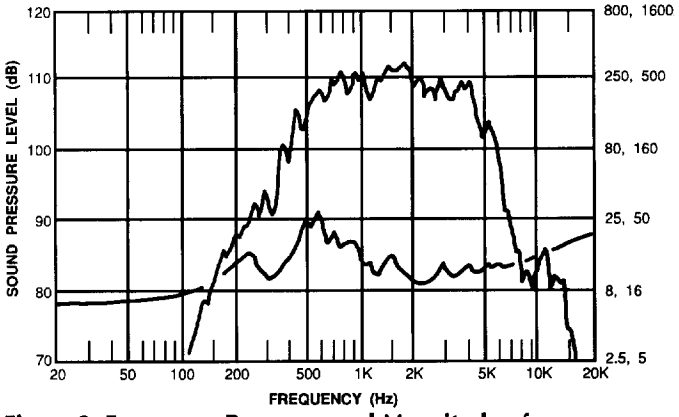


Figure 2. Frequency Response and Magnitude of Impedance with 290-L Driver (See Note 2)

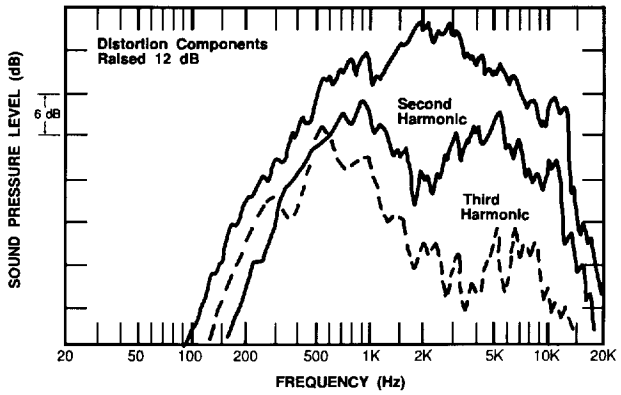


Figure 3. Harmonic Distortion at 0.1 Rated Power (299-A Driver, 5 watts, See Note 3)

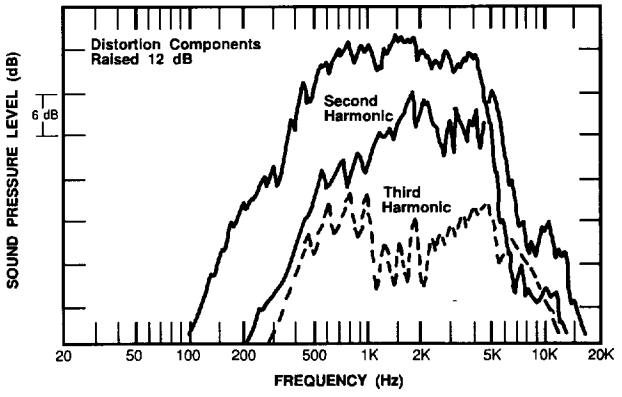


Figure 4. Harmonic Distortion at 0.1 Rated Power (290-L Driver, 12 watts, See Note 3)

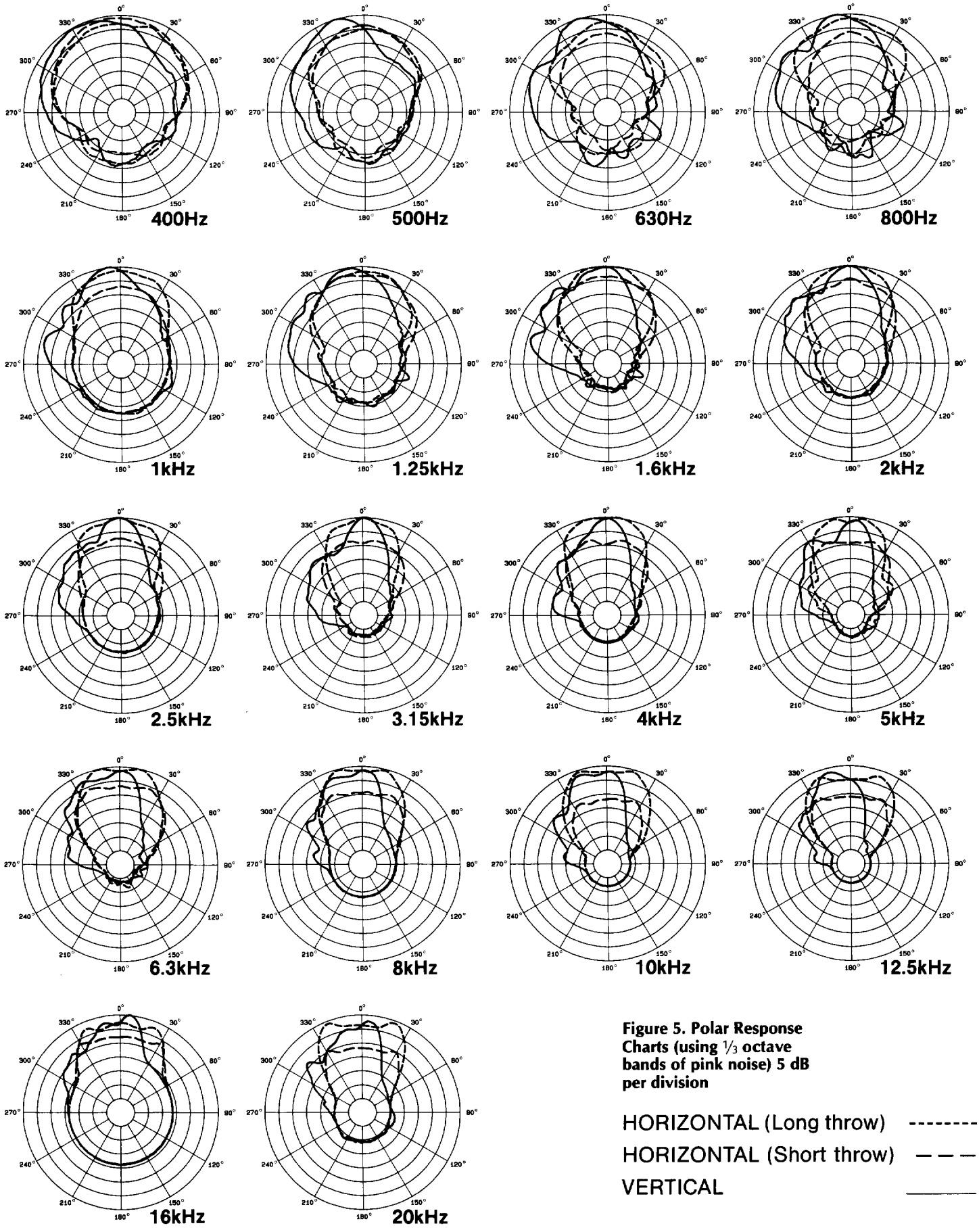


Figure 5. Polar Response Charts (using 1/3 octave bands of pink noise) 5 dB per division

HORIZONTAL (Long throw) --------

HORIZONTAL (Short throw) — — —

VERTICAL ———

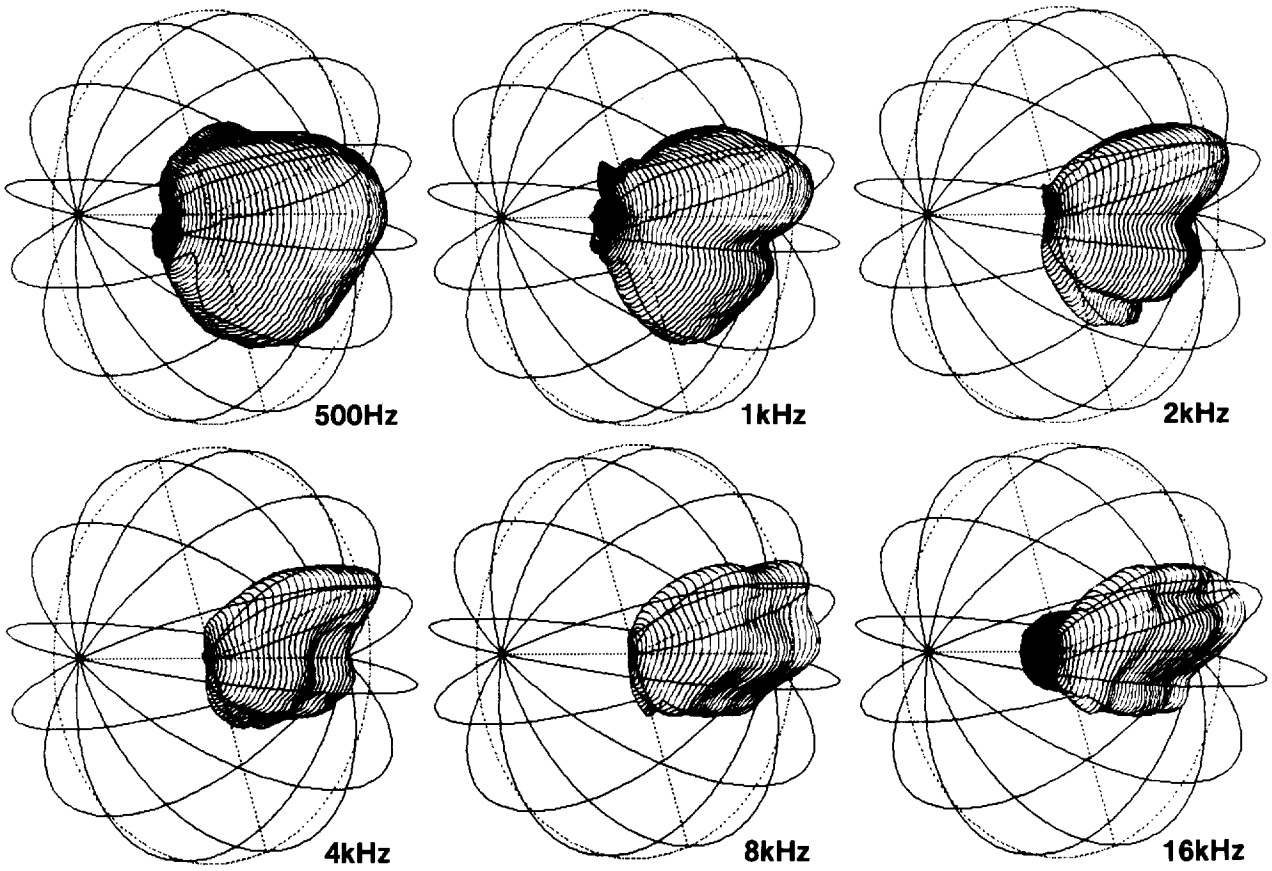
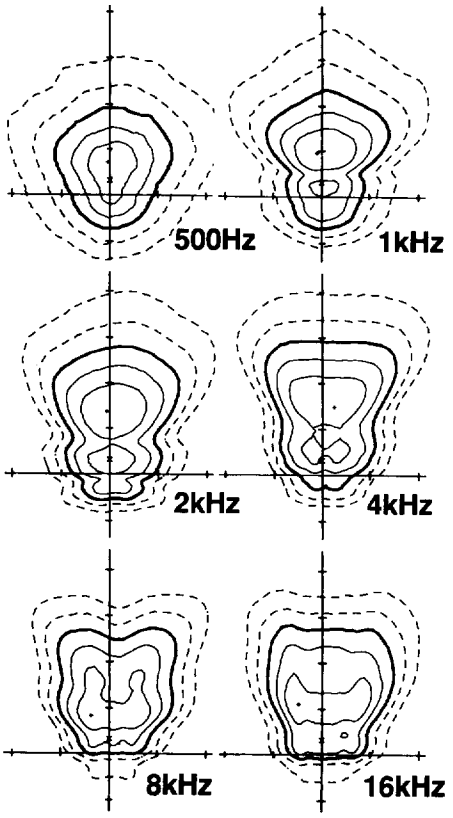
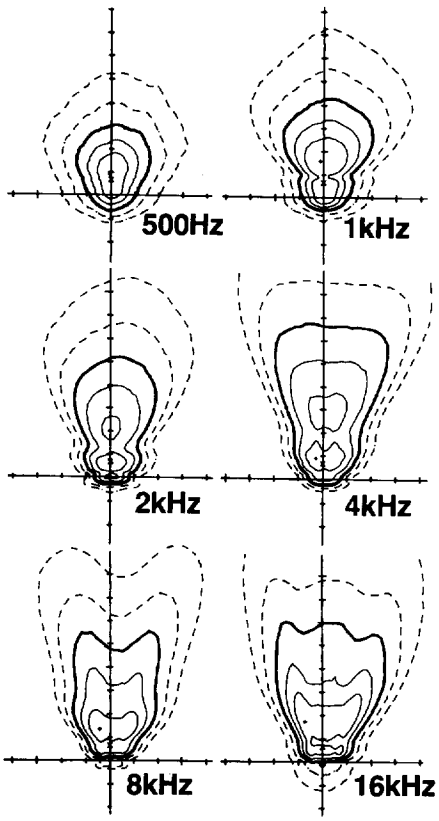


Figure 6. 3D Balloons



NOTE: Horn aiming angle provides an aspect ratio of 1 to 1.2.



NOTE: Horn aiming angle provides an aspect ratio of 1 to 1.7.

Figure 7. Floor Plan Isobars

USER NOTES

It will be appreciated that the asymmetrical dispersion pattern of the VIR horn is impossible to fully characterize with horizontal and vertical polars alone. These offer only a slice of what is happening. In addition to "long throw" horizontal, "short throw" horizontal and vertical 1/3 octave polars, we have provided two new ways of viewing 3D directivity data. They are the floor plan isobar and the 3D directivity balloon, a description of both follows.

FLOOR PLAN ISOBARS

The sound pattern radiated by a loudspeaker can be described by a set of "isobar" curves. Floor plan isobar curves show the "footprint" (the sound pattern created on the floor including SPL correction for distance) of a horn mounted in the air and pointed down at various angles (see figure 11). The patterns shown in figure 11 each consist of five lines of contours with an "X" in the center. The "X" marks the horn aiming spot, and the contours represent locations off axis where the sound pressure is constant. The inner two dotted contours define the -3dB and -6dB down boundries. The middle solid contour indicates the coverage area where the SPL is 9dB below maximum, and the outer two dotted contours show -12dB and -15dB respectively.

The -9dB contour gives an accurate indication of the area that can be covered by the VIR horn. Notice how sharply the SPL drops off at the edges of the coverage area, i.e., beyond the -9dB contour, this helps keep reflections off near by surfaces to a minimum and thereby maximizes itelligibility.

The floor plan isobars shown in figure 11 are scaled in units of "H", the height above the floor that the horn is mounted. Two aiming angles are provided, giving an indication of the range of room aspect ratios that can be achieved by varying the aiming angle. The examples given illustrate aspect ratios of 1 to 1.2 and 1 to 1.7.

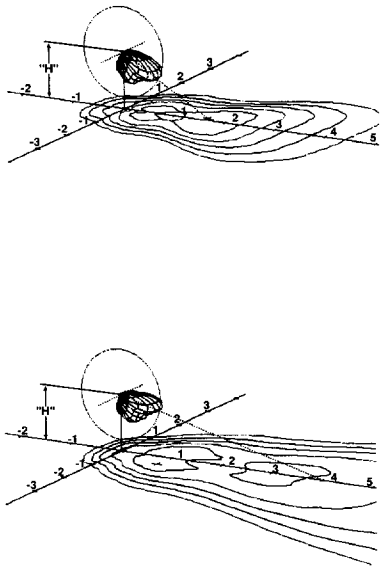


Figure 11.

REFERENCE AXIS

With horns of conventional design, it is clear that the reference axis of the horn is also the axis of greatest sensitivity. This axis is also parallel to the drivers outlet, and it is also the mounting axis of the horn. With a horn such as the Altec Lansing VIR horn there exist multiple aiming points, (as the object of the exercise is to cover a complete seating plane). Figure 12 shows the interrelationship between the driver plane, aiming angles and the horn's nominal vertical coverage pattern. Notice that for consistency, we continue to designate the horn aiming axis at the axis of greatest sensitivity.

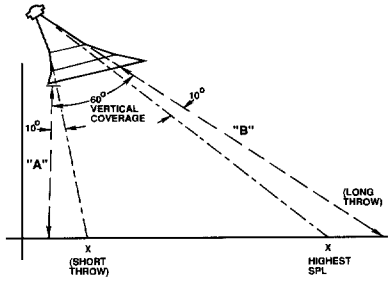


Figure 12.

3D DIRECTIVITY BALLOON

This presentation format relates the output of the VIR horn to the surface of a sphere, where the surface represents 0dB and the center -25dB. The high SPL section touches the surface of the sphere and is highlighted by the dotted line that comes from the sphere center. This is the long throw portion of the horn and has a nominal horizontal coverage angle of 60 degrees. Notice that the SPL slopes away from the sphere surface as we move in the direction of the short throw end. The horizontal coverage at this end is nominally 90 degrees. The short throw section is approximately 10dB down from the aiming point. The slope between long throw and short throw sections indicates the degree of SPL correction that has been achieved. Figure 12 shows a side view of a VIR horn illustrating the mounting configurations used to produce the two sets of floor plan isobars shown in figure 7.

An example of a 3D directivity balloon, for a two horn array, is shown in figure 13. This should help the user understand more clearly the benefit of Vari Intense™ technology.

Full AcoustaCADD™ data files are available upon request.

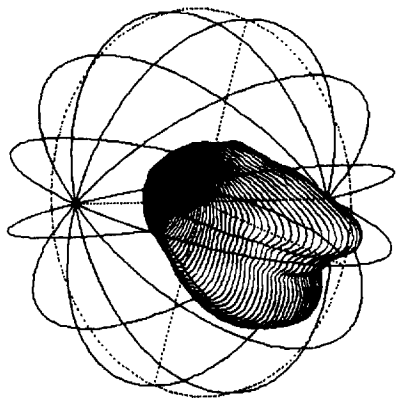


Figure 13.

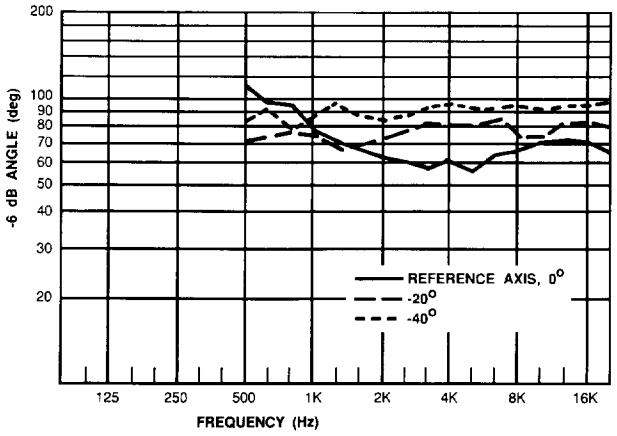


Figure 8. Dispersion Angle

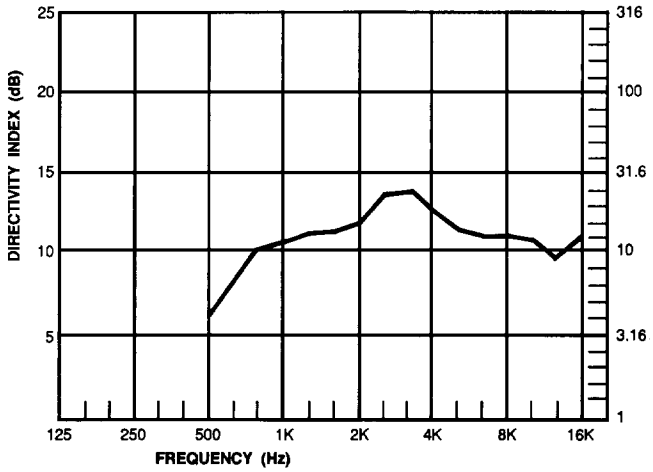


Figure 9. Q and Directivity Index

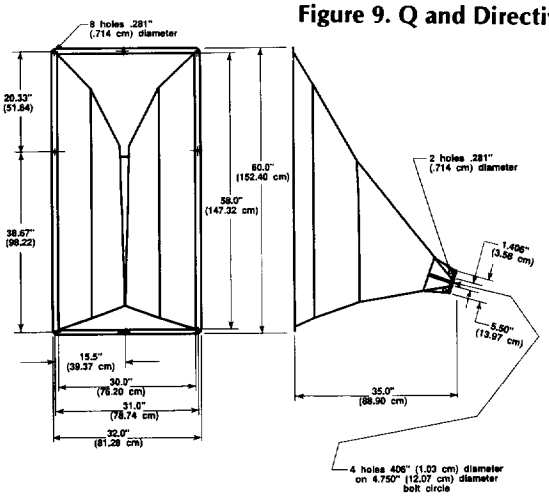


Figure 10. Mounting Information and Dimensions

NOTES ON MEASUREMENT CONDITIONS

1. On axis, pink noise signal, power calculated using $E^2/Zmin$, 3.16 meter measurement distance from horn mouth referred to one meter.
2. On axis, one watt calculated using $E^2/Zmin$, 3.16 meter measurement distance from horn mouth referred to one meter.
3. Distortion components invalid above 10 kHz. The percentage distortion of a harmonic at given frequency may be found by graphically taking the difference between the fundamental and harmonic, adding 12 dB, and applying the formula:
   percentage distortion = $100 \times 10^{-dB\ change/20}$
4. On axis frequency response has been equalized. Horn has been rotated around the apparent apex.

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS

The loudspeaker shall be a directivity control mid/high frequency horn. It shall be of heavy duty polyester resin and fiberglass molded construction. The horn shall provide both controlled coverage, in rectangular spaces, and inverse square law correction.

The horn shall meet the following performance criteria over the bandpass of 400 Hz to 16 kHz. Long-throw horizontal dispersion angle 60° (+32°, -6°); short-throw horizontal dispersion angle 90° (+8°, -11°). The nominal vertical dispersion angle shall be 60°. The horn shall provide acoustic loading for a compression driver down to 400 Hz. Pressure sensitivity shall be 112dB SPL at one meter, on the reference axis, with one watt ($E^2/Zmin$) input of band limited pink noise from 500 Hz to 3.15 kHz applied to an attached Altec Lansing 299-A type compression driver. The horn shall be 32.0 in. (81.3 cm) wide by 60.0 in. (152.4 cm) high by 35.0 in. (88.9 cm) deep and shall weigh 47 lb. (21.4 kg).

The loudspeaker shall be the Altec Lansing model VIR.

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