

# Engineering News



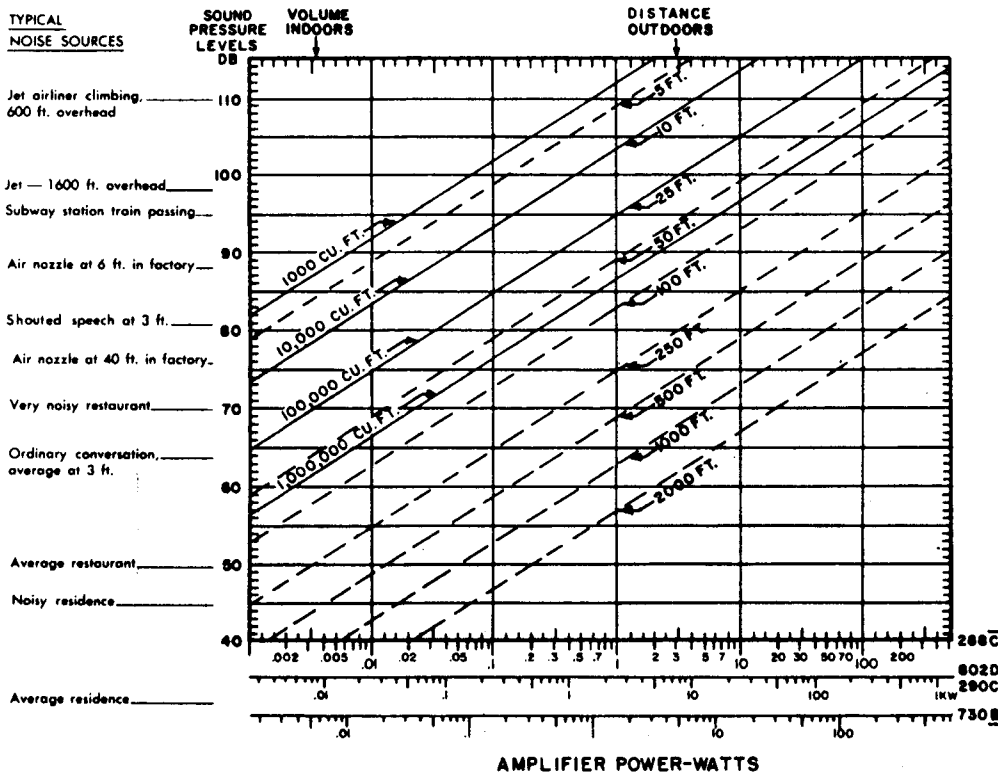
ALTEC Lansing Corporation  
A SUBSIDIARY OF LING-TEMCO-VOUGHT, INC.

1515 S. Manchester Avenue,

Anaheim, California

Technical Letter No. 108

## SOUND SYSTEM POWER REQUIREMENTS



### INDOORS

FOR VERY LIVE ROOM, divide required power by 3 or add 5 db to sound level indicated by chart.  
FOR VERY DEAD ROOM, multiply required power by 3 or subtract 5 db from chart level.

### OUTDOORS

IN OUTDOOR SYSTEMS, the sound pressure depends upon the area covered by the horn. The chart is direct reading for the 8-cell Altec horns. Increase the power required by 25% for 10-cell, 100% for 15-cell, 150% for 18-cell horns and by 100% for the 511.  
Beyond 100 feet or more, correct for additional losses due to air MOLECULAR ABSORPTION and to GRADIENTS of temperature and wind. Air absorption may be typically 4 db for every 1000 feet. Typical attenuation due to gradients may be: upwind — zero db to 100 or 250 feet, 25 to 30 db at 400 to 600 feet, and no further increase with distance; downwind — no attenuation to about 200 feet, then 3 db at 400 feet; 6 db at 800, 9 db at 1600, 12 db at 3200 feet, etc.

### GENERAL

FOR MUSIC AT CONCERT LEVEL, provide power capacity sufficient to produce sound level peaks of 105 db rms. (See also recommendations for motion picture theatres.)  
FOR MUSIC AT NORMAL LEVEL, provide for sound level peaks of 95 db.  
FOR SPEECH, provide power that with pure tone produces level of at least 75 db for quiet areas, or 75 db plus the amount by which the average noise level exceeds 52 db for professional quality and intelligibility. Reduce by 5 db for commercial quality, by 10 db for repeated speech as in paging or in communicating emergency instructions and by 20 db for marginal performance with repeated speech in limited familiar vocabulary and with 5 db of peak clipping.  
SPEAKERS OR HORNS must be provided to cover the listening area with direct sound of the required level, whether indoors or outdoors. When more than one horn is required outdoors to cover different areas, or for a distributed speaker system indoors, multiply the chart power by the number of horns. For indoor spaces of normal auditorium proportions in which the speakers are arranged in a central group, or when more than one driver is used on a horn indoors or outdoors, do not multiply by the number of sources.  
DISTRIBUTED (LOW LEVEL) SPEAKER SYSTEMS are those in which areas are covered with sound by means of speakers located close by. Ignore the room size, and determine sound pressure level on the basis of distance. Note that use of the distance basis indoors gives level of direct sound.

### POWER REQUIREMENTS FOR MOTION PICTURE THEATERS

Recommendations of Research Council, Academy of M. P. Arts & Sciences

Seats	Recommended Electrical Power	(Approx. Av. Volume)
500	13 Watts	(50,000 Cu. Ft.)
1000	20 Watts	(130,000 Cu. Ft.)
2000	43 Watts	(350,000 Cu. Ft.)
4000	88 Watts	(1,000,000 Cu. Ft.)
6000	132 Watts	(2,000,000 Cu. Ft.)

### EXAMPLES

To produce Concert Level in a 100,000 cubic-foot auditorium having optimum reverberation for speech-and-music use requires a 10-watt amplifier for 2888 drivers. If used with 515 L. F. Speakers, 2 db of network shelving should be added and 16 watts of power is required. For 802D drivers alone or with 8038 Speakers, provide 25 watts of power.

To reproduce speech of best quality and intelligibility at 250 feet downwind in a noise ambient of 62 db, provide power for 85 db sound pressure level at peaks. For a 290C or 804 Horn, this requires amplifier power of 25 watts. For a 730 on 804, 16 watts is required. For a 730 on a 1304, provide 32 watts of power.