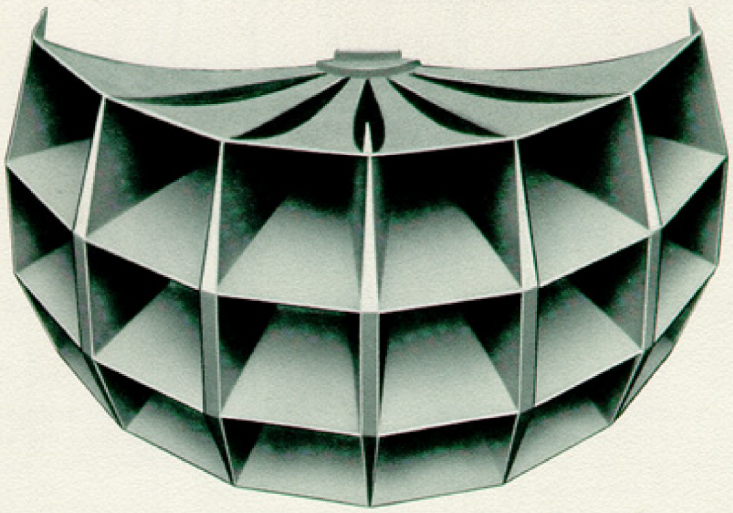
Multicellular Horns



AUDITORIUMS • STADIUMS • ARENAS • THEATRES • AIRPORT TERMINALS OUTDOOR VOICE WARNING SYSTEMS • INDUSTRIAL AND COMMERCIAL INSTALLATIONS

The exponential multicellular horn is the most efficient of all projectors for delivering top quality sound uniformly over a defined listening area. The unique excellence of the multicellular horn results from its distinctive design:

(a) The multicellular horn consists of a number of individual horns assembled in various configurations to provide controlled angles of vertical and horizontal distribution for best sound coverage of any listening area.

(b) Each horn or cell of the multicellular horn is a straight exponential trumpet through which sound can pass unimpeded. This is a distinct advantage over horns of the re-entrant or reflex type which severely attenuate the high frequencies and cause distortion due to sharp folds or bends in the sound passage.

(c) The column speaker exercises control of sound only in the vertical plane, whereas the multicellular horn controls sound in both the vertical and horizontal planes thus providing the added advantage of restricting sound projection into reverberant side walls.

(d) The re-entrant or reflex horn and the column speaker are handicapped by the fact that the beam width becomes steadily narrower as frequency increases, to a point where sound coverage in the critical high frequency range between 2,000 and 10,000 cycles shrinks to a narrow pencil of sound, in some cases only 15° to 30° wide.
In contrast, the beam width of the multicellular horn above the cross-over region and in the important mid- and high-frequency regions to 12,000 cycles and beyond, is independent of frequency. This entire portion of the frequency spectrum is uniformly distributed throughout the full angle of the horn.

(e) The multicellular horn with its great undistorted power handling capacity (up to 400 watts) is unequaled by any other commercially available sound projector for distribution of highest quality sound over large outdoor areas.

Altec multicellular horns will accommodate as many as four drivers of the 288C type for indoor use, or 730B and 290D type for outdoor use. The latter drivers and the 30546 angle adaptor in combination with a multicell horn constitutes a complete All-Weather system.

The multicellular horn was developed by the Bell Telephone Laboratories of a necessity to insure the success of early talking pictures. Ordinary horns proved incapable of providing good quality coverage to every seat in large theatres, most of which were far from ideal acoustically. The folded horn was discarded in theatre work in 1934 and since that time the multicellular horn has remained the standard of excellence.

The 300 cycle cutoff multicellular horn is often used as a "one-way" speaker where voice only is to be reproduced, or where maximum intelligibility is required to penetrate high ambient noise levels, or for projection over long outdoor distances. The 500 cycle multicellular horn with a 500 cycle crossover network and low frequency speakers, Altec 803B or 515B, are generally used for full range "two-way" loudspeaker systems such as Altec "Voice of the Theatre" systems for the reproduction of high quality voice and music.

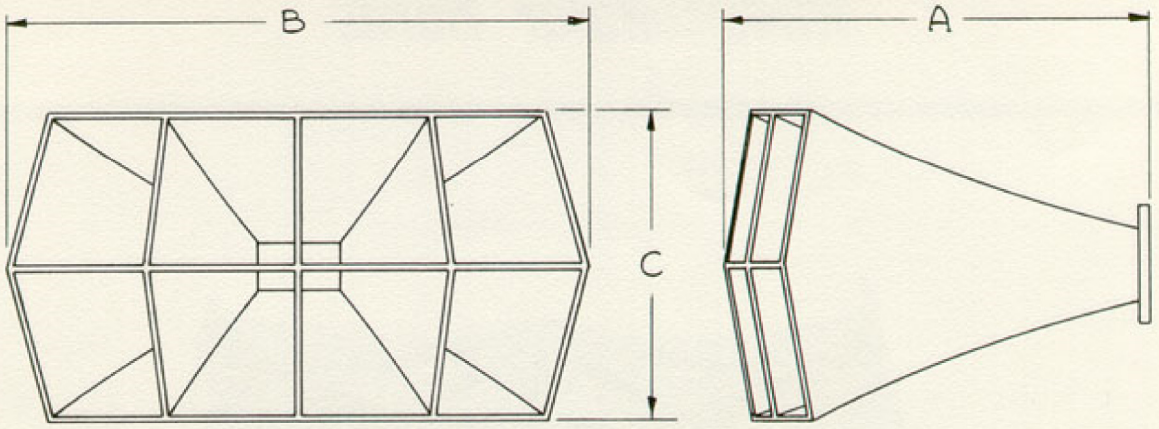
PERFORMANCE AND SPECIFICATION DATA ON BACK PAGE

ALTEC LANSING CORPORATION

A Subsidiary of Ling-Temco-Vought, Inc.

1515 S. Manchester Ave., Anaheim, Calif.

New York



Multicellular Horns

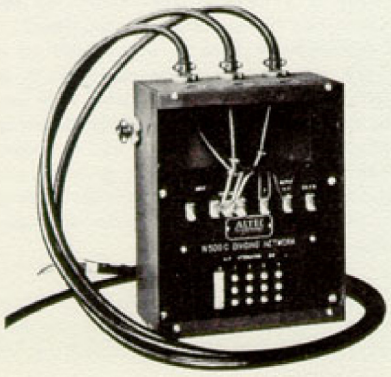
HOW TO SELECT THE CORRECT MULTICELLULAR HORN FOR SPECIFIC AREA COVERAGE

Multicellular projectors are available in several configurations. The sound distribution pattern (angle) is determined by the cell arrangement. Each cell of a 500 cycle horn projects sound over an area of 20° square, or 400 square degrees per cell; a 400 cycle horn distributes sound over an area of 19° square per cell and a 300 cycle horn over an area of 17-1/2° square per cell (2038 horn - 20° square per cell). The sound distribution pattern, both horizontal and vertical, of a horn, is established by the total number of cells assembled in each plane.

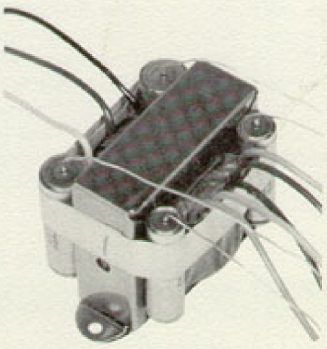
Determine the area to be covered and, by reference to the chart on page 4 of this bulletin, select the horn having a distribution pattern which will most closely cover this area. To obtain full advantage of controlled distribution, no greater area of sound coverage should be provided than can be effectively used. Multicellular horns are composed of a group or stack of individual horns so that each small horn becomes a component part of the large horn assembly. All cells are fed from a common throat.

The partial spherical front achieved by grouping the cells allows each cell to contribute to the whole without overlap or confusion. In installations where speech only is to be projected, the projection ability of a 300 cycle horn can be increased by sharply cutting off the low frequency energy fed the horn an octave above the rated cutoff of the horn by use of an Altec N-500C network or the 15045A 70-volt line transformer. In this manner, the horn has an effective length considerably greater than its physical length. By selection of the proper cell configuration, the projected sound is fully controlled in both the vertical and horizontal plane and this feature proves useful in combating high reverberation and in minimizing or eliminating acoustic feedback. A 300 cycle horn in combination with a 500 cycle crossover network, will greatly aid in overcoming objectionable reverberation by giving the horn greater projection ability by restricting the radiation of the low frequencies, which are often undesirable in the masking of sound and contribute little or nothing to speech intelligibility.

Accessories



N-500C Dividing Network Set



15045A 70-Volt
Line Transformer

30546 45° weatherproof throat adapter

30162 horn throat (single unit)

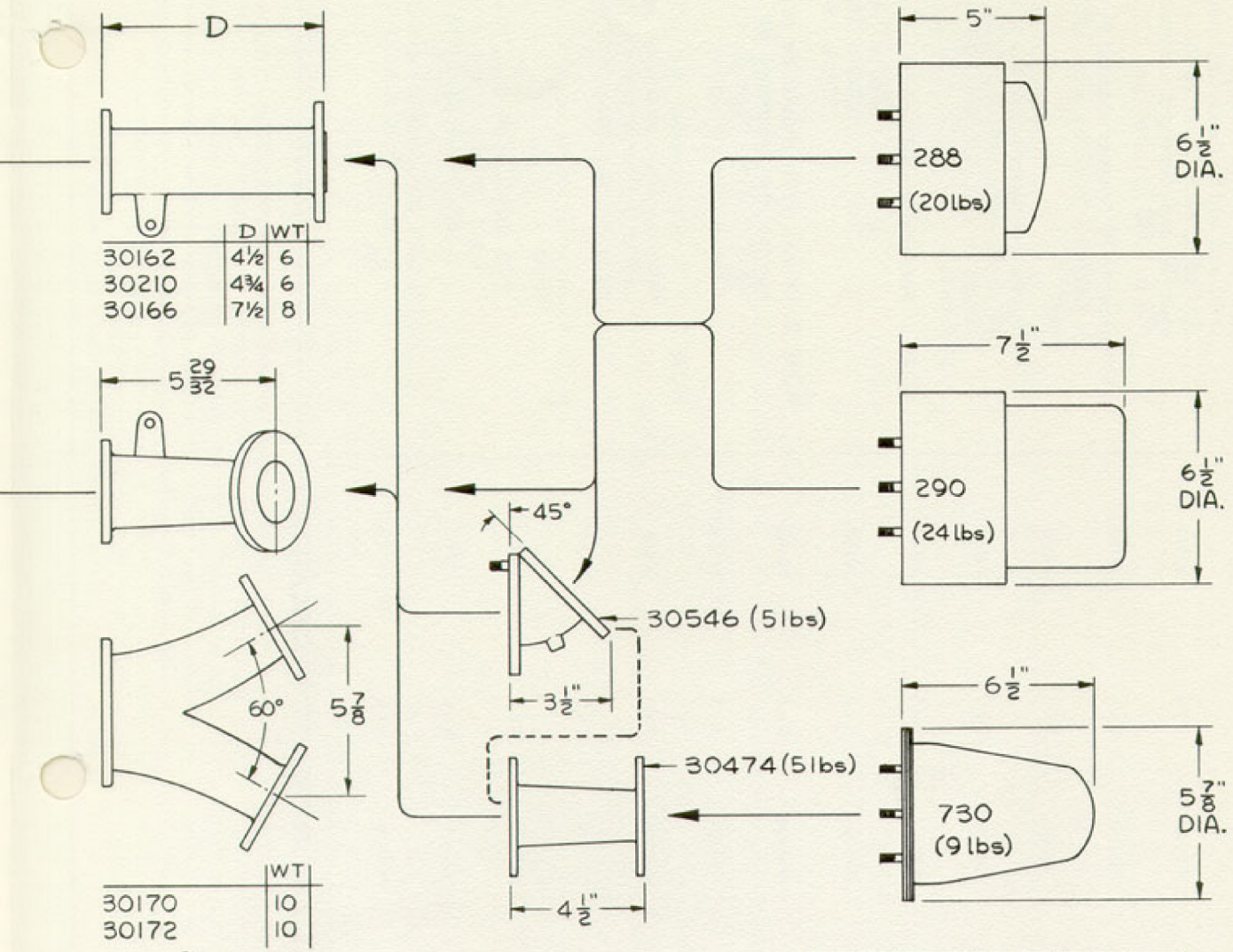
30210 horn throat (single unit)

30166 horn throat (single unit)

30170 horn throat (double unit)

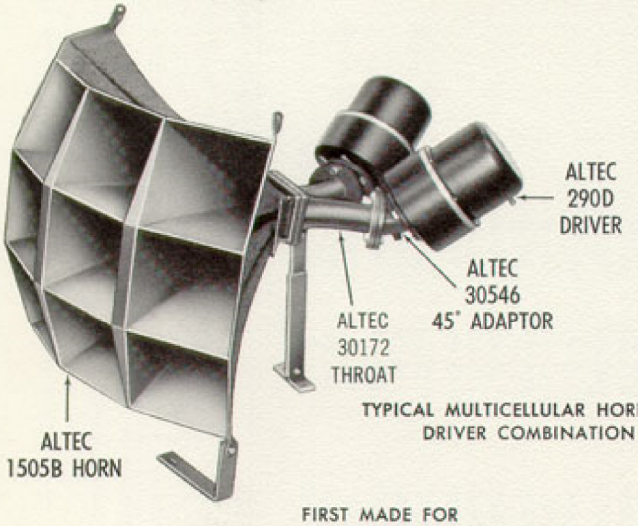
30172 horn throat (double unit)

30474 adapter



	D	WT
30162	4½	6
30210	4¾	6
30166	7½	8

	WT
30170	10
30172	10



TYPICAL MULTICELLULAR HORN AND DRIVER COMBINATION

HORN	A	B	C	WT.
203B	31	32	17	22
803B	26 1/2	32	16 1/4	27
804B	23 1/2	32	16 1/4	25
805B	17 1/2	24 1/2	13	17
1003B	25 1/2	38	16 1/8	32
1004B	*20 1/2	38 1/2	16 1/4	30
1005B	17 1/4	30	13	20
1504B	*21	38 3/4	24	48
1505B	16 3/4	30 1/2	18 1/2	22
1803B	27 1/2	44	24	60
1804B	*23 1/2	44	24	58

*(Add 4" for throat adapter)
(Furnished)

FIRST MADE FOR

TOLERANCES EXCEPT AS NOTED: FRACT. ± 1/64" DEC. ± .005" HOLE SIZES 0 TO 1/2" ± .001 OVER 1/2" ± .005 ANGULAR ± 1/2°

ISSUE	APPR'D	DATE	CHANGE

ALTEC LANSING CORPORATION
ANAHEIM, CALIFORNIA

DR. BY

ALC 53

MULTICELLULAR HORN PERFORMANCE CHART

Horn Model Number* (a)	Quantity of Drivers Used per Horn (b)	Driver Model Number (c)	Sound Pressure Level Full Power Each Driver** Measured at 30 feet (d)	Sound Pressure Level Full Power Each Driver** Measured at 100 feet (d)	Distribution Pattern (e)	Cutoff Frequency (f)	Cell Configuration	Throat Code Number ***
203B	1	288C	118 db	108 db	20° x 40°	300 cps	1 x 2	(not required)
		290D	121 db	111 db				
		730B	114 db	104 db				
803B	1	288C	115 db	105 db	35° x 70°	300 cps	2 x 4	30162
		290D	118 db	108 db				
		730B	111 db	101 db				
804B	2	288C	118 db	108 db	35° x 70°	400 cps	2 x 4	30172
		290D	121 db	111 db				
		730B	114 db	104 db				
805B	1	288C	113 db	103 db	40° x 80°	500 cps	2 x 4	30162
		290D	116 db	106 db				
		730B	109 db	99 db				
1003B	1	288C	113 db	103 db	35° x 90°	300 cps	2 x 5	30210
		290D	116 db	106 db				
		730B	109 db	99 db				
1003B	2	288C	116 db	106 db	35° x 90°	300 cps	2 x 5	30170
		290D	119 db	109 db				
		730B	112 db	102 db				
1004B	4	288C	119 db	109 db	40° x 100°	400 cps	2 x 5	(2) 30170****
		290D	122 db	112 db				
		730B	115 db	105 db				
1005B	1	288C	112 db	102 db	40° x 100°	500 cps	2 x 5	30210
		290D	115 db	105 db				
		730B	108 db	98 db				
1005B	2	288C	115 db	105 db	40° x 100°	500 cps	2 x 5	30170
		290D	118 db	108 db				
		730B	111 db	101 db				
1504B	4	288C	118 db	108 db	60° x 105°	400 cps	3 x 5	(2) 30170****
		290D	121 db	111 db				
		730B	114 db	104 db				
1505B	1	288C	110 db	100 db	60° x 105°	500 cps	3 x 5	30166
		290D	113 db	103 db				
		730B	106 db	96 db				
1505B	2	288C	113 db	103 db	60° x 105°	500 cps	3 x 5	30172
		290D	116 db	106 db				
		730B	109 db	99 db				
1803B	1	288C	110 db	100 db	53° x 105°	300 cps	3 x 6	30166
		290D	113 db	103 db				
		703B	106 db	96 db				
1803B	2	288C	113 db	103 db	53° x 105°	300 cps	3 x 6	30172
		290D	116 db	106 db				
		730B	109 db	99 db				
1804B	4	288C	116 db	106 db	60° x 125°	400 cps	3 x 6	(2) 30170****
		290D	119 db	109 db				
		730B	112 db	102 db				

* Model code denotes number of cells and horn cutoff frequency. Example: 1504B = a 15 cell horn (3 rows of 5 cells per row) with cutoff frequency of 400 cps.

** Sound Pressure Level (SPL) as shown in column (d) above is based or measured at 30 and 100 feet with full rated power applied to each driver as shown in column (b) and averaged uniformly over 600 to 2,400 cps. (see note 1.)

*** One 30474 Adapter required in addition to indicated throat for each 730B Driver used.

**** If only two drivers are desired on the 400-cycle horn, use two 30210 single throats in place of two 30170 double throats.

NOTE 1. Full power rating on
288C is 40 watts
290D is 100 watts
730B is 60 watts

NOTE 2. Driver units should be protected against low frequency by use of N500C Altec Network, or the 15045A Line Transformer.

NOTE 3. It is recommended that 30546 45-degree angle adapters be added to each driver for added weather protection in all outdoor installations.

NOTE 4. Sound Pressure Level Conversion Table

I) To increase SPL 3 db double the input power; to increase 6 db, quadruple the input power.

II) Each time distance of horn projection is doubled substract 6 db SPL.

ARCHITECTS AND ENGINEERS SPECIFICATIONS

The high-frequency horn shall be of the multicellular type, equipped with proper throat and adapters and (b) (c) compression driver or transducer. As specified elsewhere, it shall produce a uniform sound pressure field of (d) db at a distance of (select from d) feet with (Note 1) watts input power applied to each driver over a field of distribution of (e) uniformly averaged over the band of 600 to 2,400 cps. Single frequency measurements will not be acceptable under this specification. The low-frequency cutoff shall be (f) cps.

The horn shall be constructed of individual weatherproofed metal cells with a special damping material coating the external surfaces of each cell. The cells shall all be straight with an exponential expansion. Folded or re-entrant horns or horns fabricated of wood or other fiberous materials will not be acceptable. The horn shall be equipped with mounting brackets or facilities both on the front or mouth and on the appropriate cast throat. Multicellular horn shall be Altec Lansing Model (a).
(Note: Fill in proper values and numbers from Horn Performance Chart.)

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