

## 309 Series

### 8-inch Duplex® Ceiling Loudspeakers

- Offers wide dispersion, high efficiency
- Dual magnet construction
- Multiple transformer taps
- High SPL capability

#### Description

The Altec Lansing 309 series Duplex® loudspeaker systems are two-way loudspeakers with 8-inch low-frequency cones and high-temperature voice-coil assemblies coaxially mounted with wide-dispersion cone tweeters. The dual magnet construction allows each speaker to be structurally, magnetically, electrically and mechanically independent of the other. The 309-8A/309-4T/309-8T utilize a single section crossover network, centered at 3,000 Hz and providing 6 dB of attenuation for the tweeter outside its operating range.

The 309-4T is provided with a 70-V line transformer that offers <1 dB insertion loss and a selection of 0.25-, 1-, 2- and 4-W taps. The 309-8T is provided with a 70-V line transformer that offers <1 dB insertion loss and a selection of 1-, 2-, 4- and 8-W taps.

The 5281-W grille is available as an accessory and provides an attractive means to conceal the loudspeaker in ceiling or wall installations. The perforated grille is finished in semigloss white enamel. Other grilles available include the 5281-S (satin aluminum), 5282-W and 5284-WM (both are square grilles).

Five sealed, metal ceiling-type enclosures are offered with the 309-8A/309-4T/309-8T.

Each is made of heavy-gauge, rugged, cold-rolled steel, undercoated to prevent panel resonance, and finished with rust-inhibiting paint. The enclosures are classified as Utility or Deluxe. Utility models are as follows: 5183-X, 5184-E and 5184-N. Deluxe enclosures are lined with glass wool blankets. Deluxe models are as follows: 5181-XM, 5182-XM, 5184-X and 5189-X.

These components are designed to work together as a complete system of in-ceiling loudspeakers and accessories. They give wide dispersion, high-efficiency, high-maximum output, ease of installation and wide-range reproduction of music or voice.

#### Architects' and Engineers' Specifications

The loudspeaker shall be a Duplex® type with an 8-inch low-frequency cone radiator and a coaxially mounted, wide-dispersion cone tweeter. The Duplex® loudspeaker shall meet the following criteria: AES power rating shall be 16 watts of band-limited pink noise (85 Hz to 18 kHz, 6-dB crest factor). Frequency response will be uniform from 85 Hz to 18 kHz on both the transformer and non-transformer versions. Pressure sensitivity, 96 dB SPL at 1 meter (94 dB at 4 feet) on axis with one watt of band-lim-

ited pink noise from 500 Hz to 3 kHz (ref. 20  $\mu$ Pa). Minimum impedance, 6.0 ohms.

The loudspeaker shall be 206.5 mm (8.13 in.) in diameter and 82.5 mm (3.25 in.) deep. Weight shall be 1.3 kg (2.8 lb) [309-8A], 1.4 kg (3.1 lb) [309-4T] and 1.45 kg (3.2 lb) [309-8T]. The 309-4T shall have a 70-V transformer with taps at 0.25, 0.5, 1, 2 and 4 watts. The 309-8T shall have a 70-V transformer with taps at 1, 2, 4 and 8 watts. The maximum insertion loss shall be <1.0 dB. The Duplex® loudspeakers shall be the Altec Lansing 309-8A; and 309-4T and 309-8T with transformer.

#### Uniform Limited Warranty Statement

Altec Lansing products are guaranteed against malfunction due to defects in materials or workmanship for a specified period, as noted in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual, beginning with the date of original purchase. If such malfunction occurs during the specified period, the product will be repaired or replaced (at our option) without charge. The product will be returned to the customer prepaid. **Exclusions and Limitations:** The Limited Warranty does not apply to: (a) exterior finish or appearance; (b) certain spe-

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cific items described in the individual product-line statement(s) below, or in the individual product data sheet or owner's manual; (c) malfunction resulting from use or operation of the product other than as specified in the product data sheet or owner's manual; (d) malfunction resulting from misuse or abuse of the product; or (e) malfunction occurring at any time after repairs have been made to the product by anyone other than EVI Audio Service or any of its authorized service representatives. **Obtaining Warranty Service:** To obtain warranty service, a customer must deliver the product, prepaid, to EVI Audio Service or any of its authorized service representatives together with proof of purchase of the product in the form of a bill of sale or receipted invoice. A list

of authorized service representatives is available from EVI Audio Service at 10500 W. Reno Avenue, Oklahoma, OK 73127 (800/845-8727 or FAX 405/577-3274). **Incidental and Consequential Damages Excluded:** Product repair or replacement and return to the customer are the only remedies provided to the customer. Altec Lansing shall not be liable for any incidental or consequential damages including, without limitation, injury to persons or property or loss of use. Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitation or exclusion may not apply to you. **Other Rights:** This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

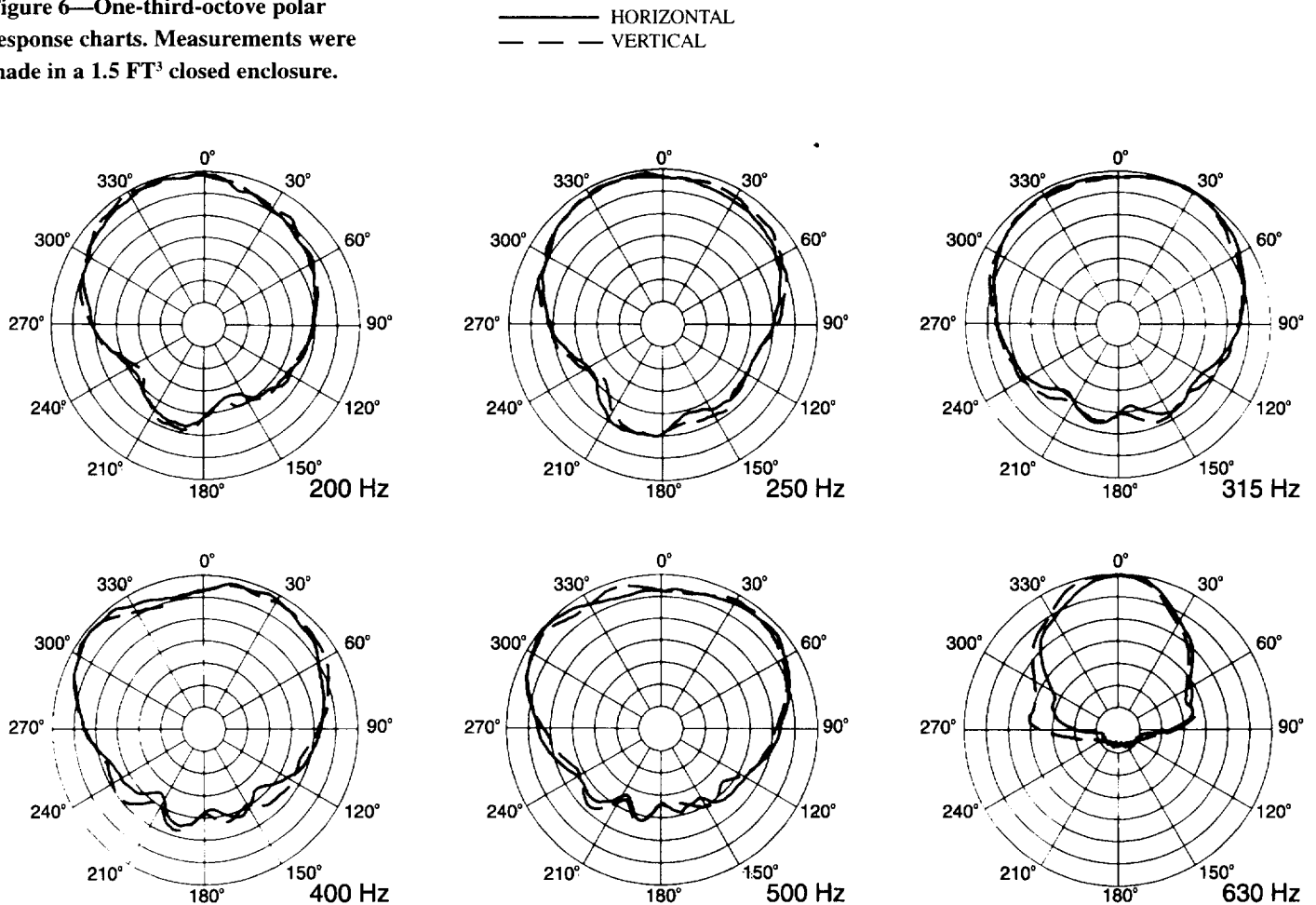
**Altec Lansing Speakers and Speaker Sys-**

**tems are guaranteed against malfunction** due to defects in materials or workmanship for a period of five (5) years from the date of original purchase. The Limited Warranty does not apply to burned voice coils or malfunctions such as cone and/or coil damage resulting from improperly designed enclosures. Altec Lansing active electronics associated with the speaker systems are guaranteed for three (3) years from the date of original purchase. Additional details are included in the Uniform Limited Warranty statement.

**For technical assistance,** contact Technical Support at 800/234-6831 or 616/695-6831, M-F, 8:00 a.m. to 5:00 p.m. Eastern Standard time.

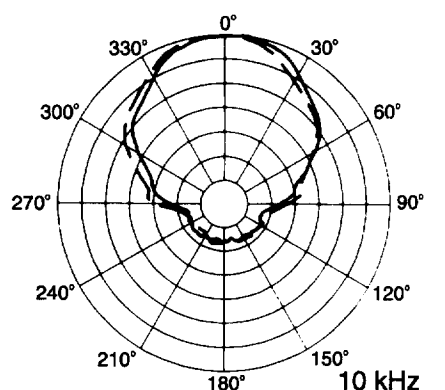
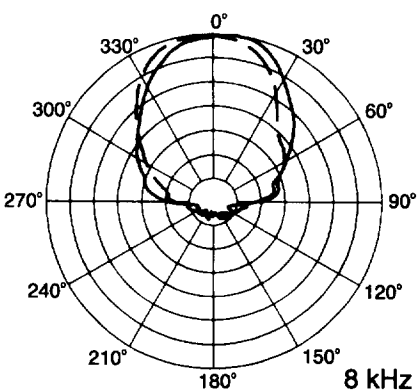
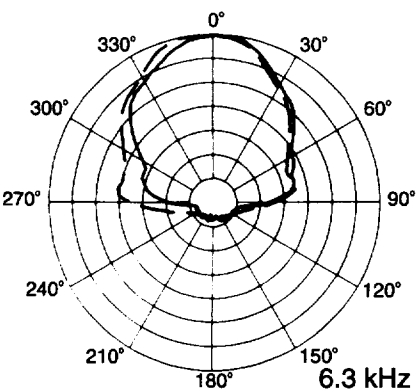
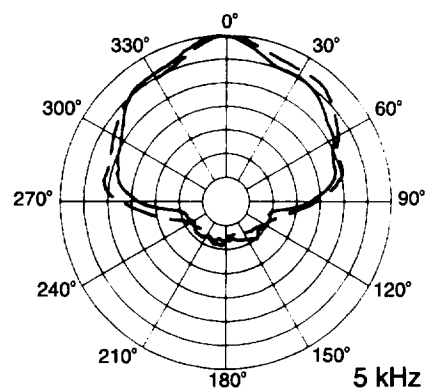
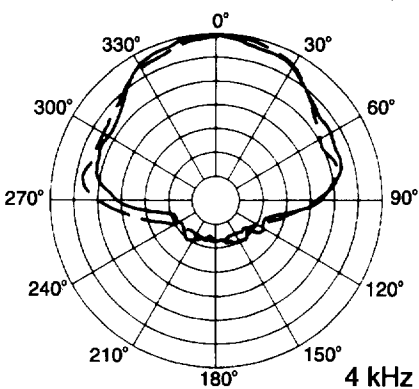
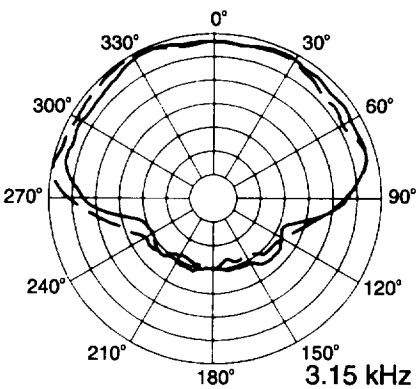
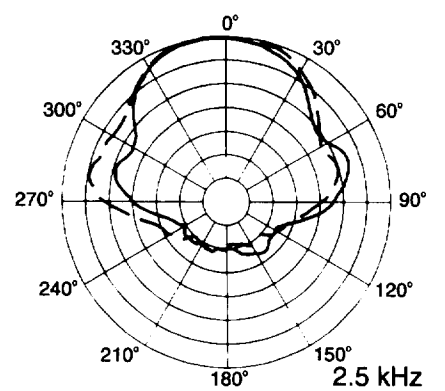
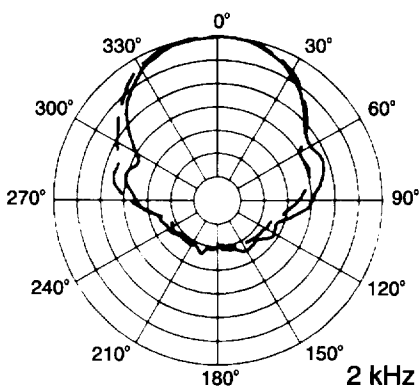
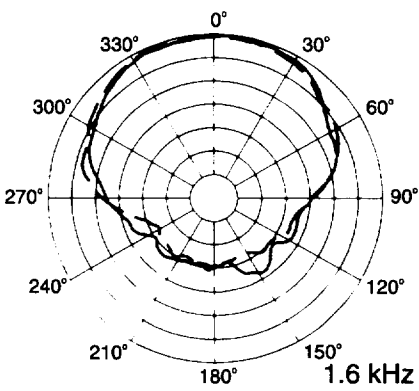
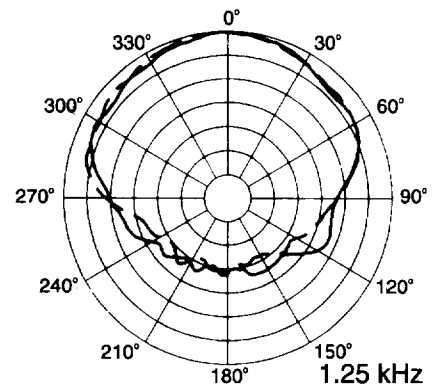
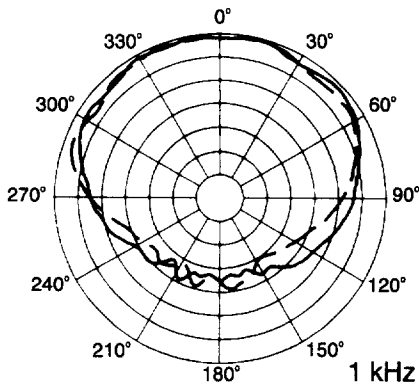
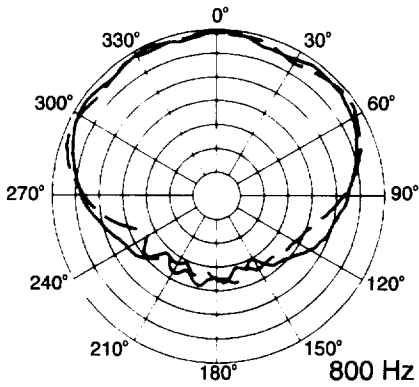
Specifications subject to change without notice.

**Figure 6—One-third-octave polar response charts. Measurements were made in a 1.5 FT<sup>3</sup> closed enclosure.**

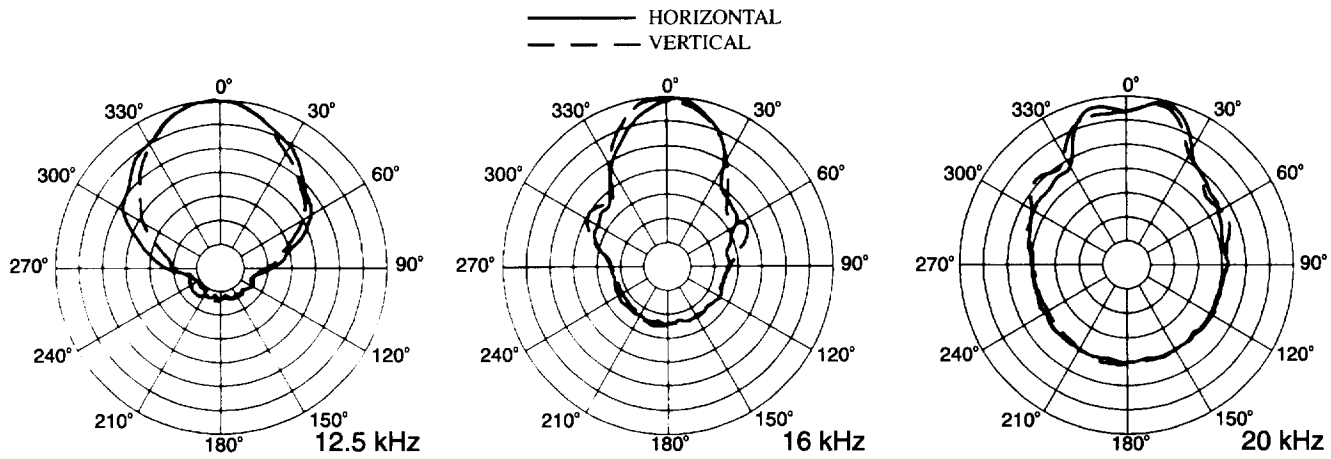


# 309 Series 8-inch Duplex<sup>(U)</sup> Ceiling Loudspeakers

— HORIZONTAL  
- - - VERTICAL



# 309 Series 8-inch Duplex<sup>®</sup> Ceiling Loudspeakers



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Figure 1—Amplitude Response

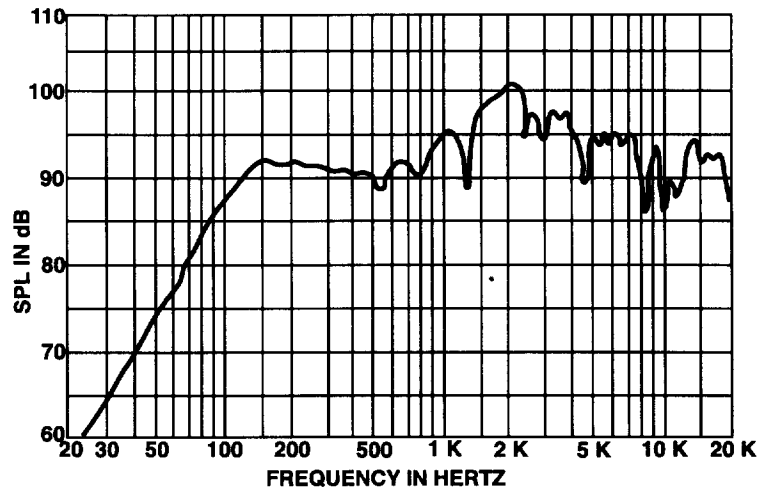
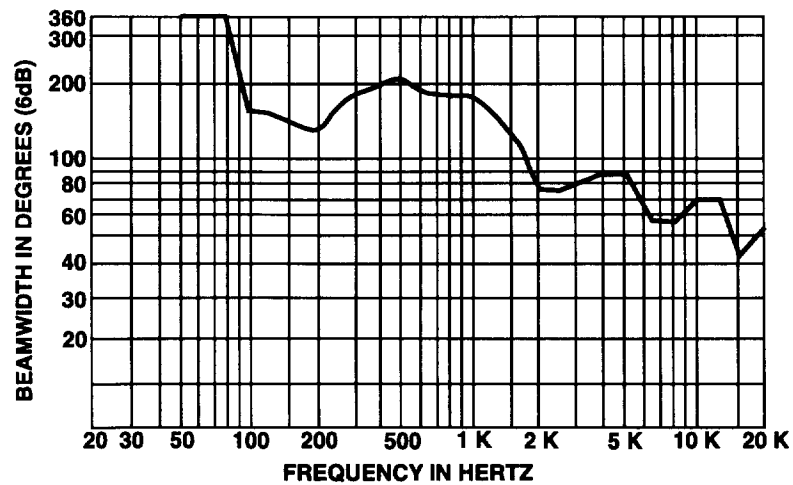


Figure 2—Beamwidth vs. Frequency



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Figure 3—Impedance Response

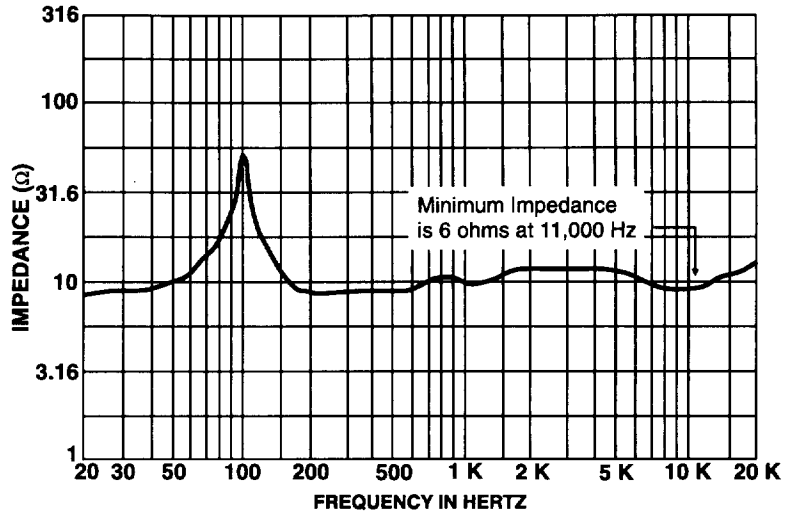


Figure 4—Directivity and Q

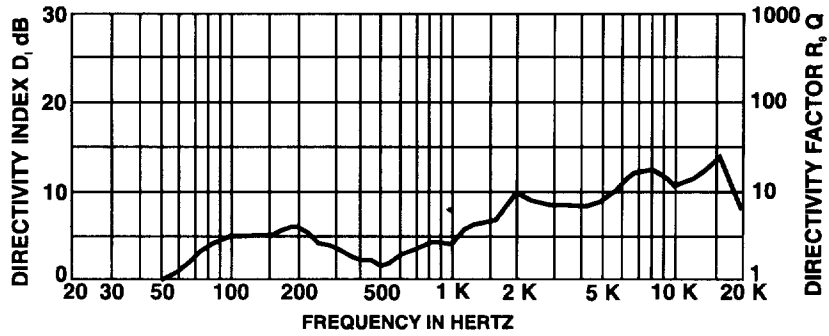
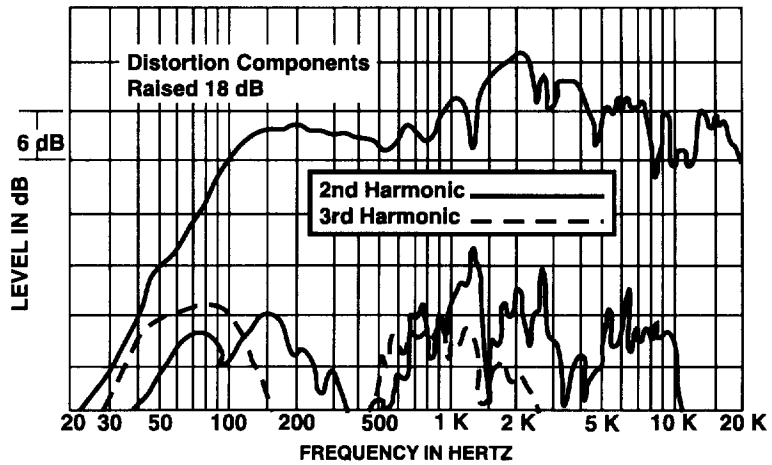


Figure 5—Distortion Response



# 309 Series 8-inch Duplex<sup>®</sup> Ceiling Loudspeakers

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## Specifications

### System Type:

Two-way, full-range, Duplex<sup>®</sup> loud-speaker system

### Pressure Sensitivity:

96 dB SPL (1 W, 500 Hz - 3 kHz)  
re: 20  $\mu$ Pa, see Note 1)

### Frequency Response:

85 Hz - 18 kHz (see Figure 1, Note 2)

### Power Handling:

16 watts, 85 Hz - 18 kHz, AES method  
(see Note 3)

### Maximum Long-Term Output:

107.6 dB SPL (16 W/1 m) re: 20  $\mu$ Pa,  
see Note 4)

### Impedance:

6.0-ohms minimum at 11 kHz. 8.0-ohms  
nominal

### Components:

8-inch, high-efficiency, low-frequency  
driver with a coaxially mounted,  
2.5-inch cone tweeter

### Crossover Network:

3,000 Hz with 6-dB-per-octave  
tweeter protection

### Input Terminals:

.212-in. push terminals

## 309-8A - Theile-Small Parameters

### Free Air Resonance, $f_s$ :

110 Hz

### Equivalent Volume Compliance,

$V_{AS}$ :  
0.92 ft<sup>3</sup>

### Total Q, $Q_{TS}$ :

0.94

### Electrical Q, $Q_{ES}$ :

1.16

### Mechanical Q, $Q_{MS}$ :

5.03

### Volume Displacement $V_D$ :

1.61 in.<sup>3</sup>

### Reference Efficiency:

2.87%

## Accessories,

### Grilles:

5281-W, 5281-S, 5282-W and  
5284-WM

### Enclosures:

5183-X, 5184-E, 5184-N

### Deluxe Enclosures:

5181-XM, 5182-XM, 5184-X  
and 5189-X

### Tee-bar Support:

5487-X

## Dimensions,

### Loudspeaker Diameter:

206.5 mm (8.13 in.)

### Depth:

82.6 mm (3.25 in.)

### Net Weight,

**309-8A:** 1.3 kg (2.8 lb)

**309-4T:** 1.4 kg (3.1 lb)

**309-8T:** 1.8 kg (4.0 lb)

### Shipping Weight,

**309-8A:** 1.5 kg (3.3 lb)

**309-4T:** 1.6 kg (3.6 lb)

**309-8T:** 2.0 kg (4.5 lb)

### Finish:

Black

## Specifications - Transformer

### Frequency Response:

100 Hz to 15 kHz,  $\pm 1$  dB

### Maximum Insertion Loss:

1.0 dB

### Secondary Impedance:

8 ohms

### Connection Type:

Bunch tinned wires for soldering or  
crimping.

### Primary Impedances and Power

Drawn: (see table)

309-4T:					309-8T:	
Power	70 V	70 V	100 V	100V	70 V	70 V
0.25 W	20,000 ohms	green	n/a	n/a	n/a	n/a
0.5 W	10,000 ohms	yellow	20,000 ohms	green	n/a	n/a
1.0 W	5,000 ohms	orange	10,000 ohms	yellow	5,000 ohms	yellow
2.0 W	2,500 ohms	red	5,000 ohms	orange	2,500 ohms	orange
4.0 W	1,250 ohms	brown	2,500 ohms	red	1,250 ohms	red
8.0 W	n/a	n/a	n/a	n/a	625 ohms	brown

## Notes on Measurement Conditions

1. Pink-noise signal, one watt calculated using  $E^2/Z_{min}$ , 3.16-meter measurement distance referred to one meter.
2. On-axis, one watt calculated using  $E^2/Z_{min}$ , 3.16-meter measurement distance referred to one meter, low frequencies corrected for anechoic chamber error.

3. This system rating patterned after the AES method for individual driver, where the test signal is pink noise with a 6-dB crest factor over the bandwidth of the system, with power calculated using the  $E^2/Z_{min}$ , for two hours.
4. This measurement made under the same conditions as pressure sensitivity, but at rated power, and takes into account any power compression effects due to nonlinearities in the system.

5. Distortion components invalid above 10 kHz. The distortion at any given frequency may be found by graphically taking the difference between the fundamental and harmonic, adding the number of decibels which the harmonic has been raised on the graph, and applying the formula:  
percent distortion =  $100 \times 10^{-(\text{difference in dB}/20)}$



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