

Woofer 12" especially designed for applications where the low weight is the important factor, as: portable speakers or suspended systems (Fly). It possess aluminum casting heat sink and aluminum injected basket, conferring to the system optimized refrigeration making possible the use in high power.

Its great efficiency in sound reproduction is due to the excellent combination of the different components:

- The light cone manufactured with long fiber pulp together with a surround of impregnated fabric give the array great stability high yield and low distortion.

- The voice coil is made of high temperature wire, wound on Kapton® former.

- The epoxy painted reinforced aluminum injected frame provides the array with high mechanical resistance.

- The magnet assembly was designed with the assistance of a Finite Element Analysis (FEA) software in order to ensure optimization. This product uses Neodymium technology, magnetic shield minimizing the magnetic interference, being able to be used next the electro-electronic equipment.

- The use of highly resistant adhesives guarantees optimal cohesion and durability of components.

### SPECIFICATIONS

Nominal diameter .....	380 (15)	mm (in)
Nominal impedance .....	8	Ω
Minimum impedance @ 260 Hz .....	6.9	Ω
Power handling		
Musical Program' .....	700	W
AES <sup>2</sup> .....	350	W
Sensitivity (2.83V@1 m) averaged from 50 to 4,000 Hz .....	96	dB SPL
Power compression @ 0 dB (nom. power) .....	4.14	dB
Power compression @ -3 dB (nom. power)/2 .....	2.93	dB
Power compression @ -10 dB (nom. power)/10 .....	1.24	dB
Frequency response @ -10 dB .....	50 to 4,000	Hz

<sup>1</sup> Power handling specifications refer to normal speech and/or music program material, reproduced by an amplifier producing no more than 5% distortion. Power is calculated as true RMS voltage squared divided by the nominal impedance of the loudspeaker.

<sup>2</sup> AES Standard (200 - 2 kHz).

### THIELE-SMALL PARAMETERS

Fs .....	62.5	Hz
Vas .....	38.5 (1.35)	l (ft <sup>3</sup> )
Qts .....	0.47	
Qes .....	0.48	
Qms .....	14.41	
r10 (half space) .....	1.87	%
Sd .....	0.0512 (79.36)	m <sup>2</sup> (in <sup>2</sup> )
Vd(Sd×Xmax) .....	192.0 (11.71)	cm <sup>3</sup> (in <sup>3</sup> )
Xmax (max. excursion (peak) with 10% distortion) .....	3.75 (0.14)	mm (in)
Xlim (max. excursion (peak) before physical damage) .....	18.0 (0.70)	mm (in)

Atmospheric conditions at TS parameter measurements:

Temperature .....	25 (77)	°C (°F)
Atmospheric pressure .....	1,016	mb
Humidity .....	51	%

Thiele-Small parameters are measured after a 2-hour power test using half AES power. A variation of ± 15% is allowed.

### ADDITIONAL PARAMETERS

fl .....	17.8	Tm
Flux density .....	1.20	T
Voice coil diameter .....	75 (3)	mm (in)
Voice coil winding length .....	24.5 (80.38)	m (ft)
Wire temperature coefficient of resistance (<x25) .....	0.00322	1/°C
Maximum voice coil operating temperature .....	310 (590)	°C (°F)
8vc (max. voice coil operating temp./max. power) .....	0.88 (33.58)	°C/W (°F/W)
Hvc (voice coil winding depth) .....	15.5 (0.61)	mm (in)
Hag (air gap height) .....	8.0 (0.32)	mm (in)
Re .....	6.2	Ω
Mms .....	62.4 (0.138)	g (lb)
Cms .....	104.0	nm/N
Rms .....	1.7	kg/s

### NON-LINEAR PARAMETERS

Le @ Fs (voice coil inductance @ Fs) .....	2,106	mH
Le @ 1 kHz (voice coil inductance @ 1kHz) .....	1,282	mH
Le @ 20 kHz (voice coil inductance @ 20 kHz) .....	0.751	mH
Red @ Fs .....	0.229	Ω
Red @ 1 kHz .....	2,699	Ω
Red @ 20 kHz .....	39,13	Ω
Km .....	1.2	mfi
Kxm .....	6.2	mH
Em .....	0.89	

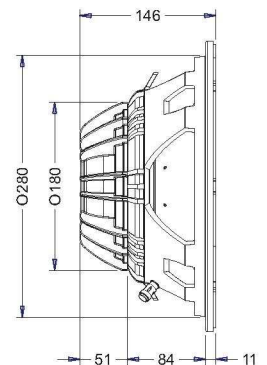
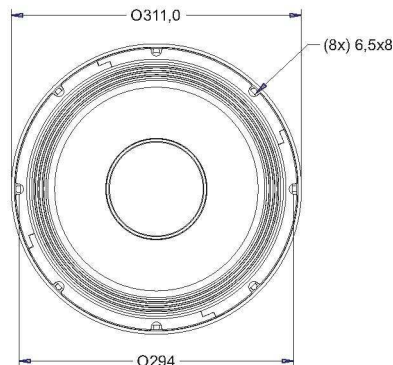


### ADDITIONAL INFORMATION

Magnet material .....	Neodymium
Magnet weight .....	350 (12.34) g (oz)
Magnet diameter x depth .....	72x13 (2.83x0.51) mm (in)
Magnetic assembly weight .....	2,300 (5.07) g (lb)
Frame material .....	Aluminum
Frame finish .....	Black epoxy
Magnetic assembly steel finish .....	Zinc-plated
Voice coil material .....	Copper
Voice coil former material .....	Polyimide (Kapton®)
Cone material .....	Long fiber pulp
Volume displaced by woofer .....	4.8 (0.169) l (ft <sup>3</sup> )
Net weight .....	3,750 (8.26) g (lb)
Gross weight .....	4,350 (9.59) g (lb)
Carton dimensions (W x D x H) .....	34 x 34 x 18 (13.38 x 13.38 x 7.08) cm (in)

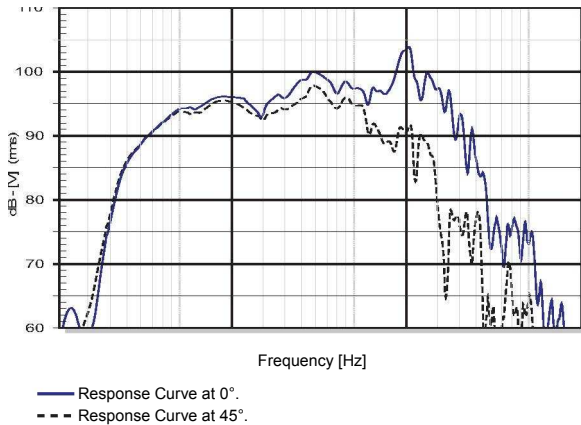
### MOUNTING INFORMATION

Number of bolt-holes .....	8
Bolt-hole diameter .....	6.5 (0.25) mm (in)
Bolt-circle diameter .....	294 (11.57) mm (in)
Baffle cutout diameter (front mount) .....	281 (11.06) mm (in)
Baffle cutout diameter (rear mount) .....	275 (10.82) mm (in)
Connectors .....	Push on terminals
Polarity .....	Positive voltage applied to the positive (+) terminal gives forward cone motion

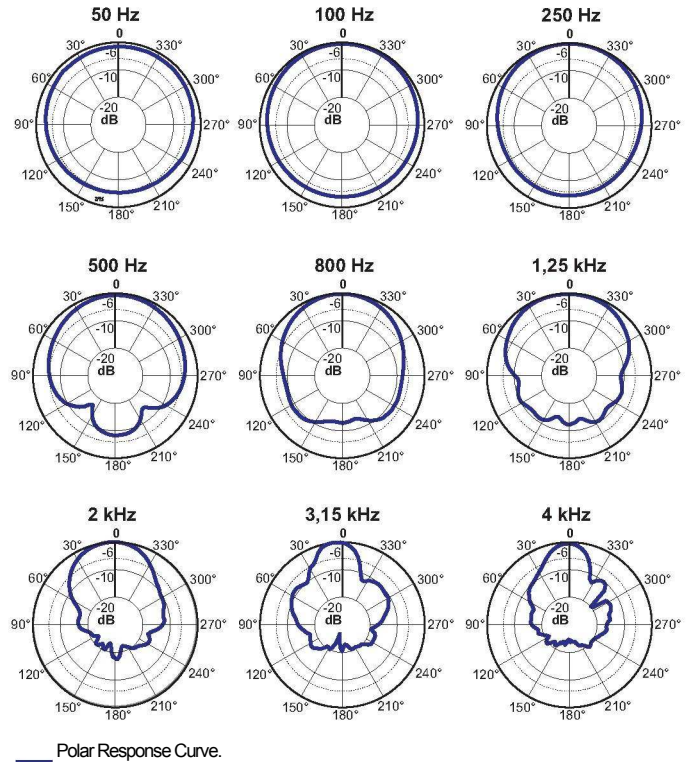


Dimensions in mm.

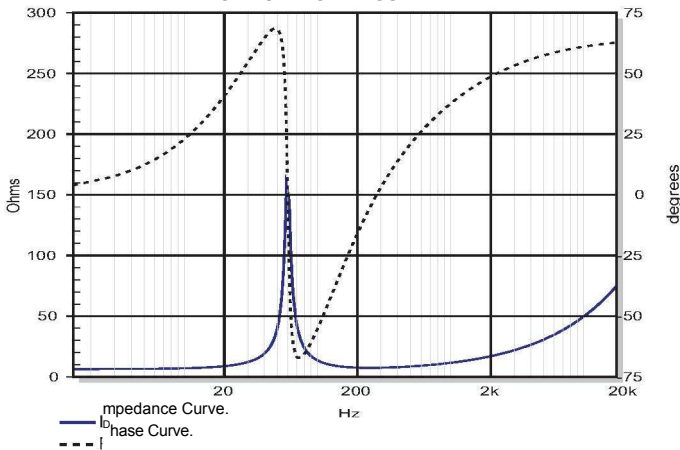
### RESPONSE CURVES (0° AND 45°) IN A TEST ENCLOSURE INSIDE AN ANECHOIC CHAMBER, 1 W/1 m



### POLAR RESPONSE CURVES



### IMPEDANCE AND PHASE CURVES MEASURED IN FREE-AIR



### HOW TO CHOOSE THE RIGHT AMPLIFIER

The power amplifier must be able to supply twice the RMS driver power. This 3 dB headroom is necessary to handle the peaks that are common to musical programs. When the amplifier clips those peaks, high distortion arises and this may damage the transducer due to excessive heat. The use of compressors is a good practice to reduce music dynamics to safe levels.

### FINDING VOICE COIL TEMPERATURE

It is very important to avoid maximum voice coil temperature. Since moving coil resistance ( $R_E$ ) varies with temperature according to a well known law, we can calculate the temperature inside the voice coil by measuring the voice coil DC resistance:

$$T_B = T_A + \left( \frac{R_B}{R_A} - 1 \right) \left( T_A - 25 + \frac{1}{\alpha_{25}} \right)$$

$T_A, T_B$  = voice coil temperatures in °C.

$R_A, R_B$  = voice coil resistances at temperatures  $T_A$  and  $T_B$ , respectively.

$\alpha_{25}$  = voice coil wire temperature coefficient at 25 °C.

### POWER COMPRESSION

Voice coil resistance rises with temperature, which leads to efficiency reduction. Therefore, if after doubling the applied electric power to the driver we get a 2 dB rise in SPL instead of the expected 3 dB, we can say that power compression equals 1 dB. An efficient cooling system to dissipate voice coil heat is very important to reduce power compression.

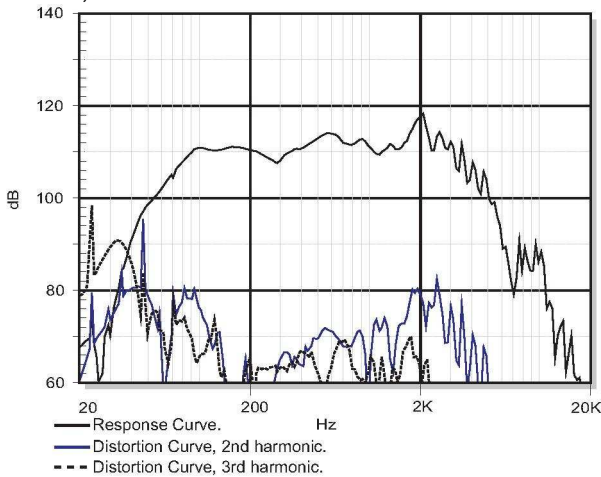
### NON-LINEAR VOICE COIL PARAMETERS

Due to its close coupling with the magnetic assembly, the voice coil in electrodynamic loudspeakers is a very non-linear circuit. Using the non-linear modeling parameters  $K_{rm}, K_{xm}, E_{rm}, E_{xm}$  from an empirical model, we can calculate voice coil impedance with good accuracy.

### SUGGESTED PROJECTS

For additional projects suggestions, please access our web site.

### HARMONIC DISTORTION CURVES MEASURED AT 10% AES INPUT POWER, 1 m



### TEST ENCLOSURE

110-litervolume with a duet 0 4" by 1,7" length.