SELENIUM

SELENIUM MG-1400

12" for midbass professional sound reinforcement.

Offering high power capacity, outstanding mid range response and exceptional long-term performance, this transducer is ideal for compact enclosures (closed, vented or horns). This transducer exhibits excellent acoustics with work horse construction. Designed for smaller enclosures, the 12MG1400 is a versatile high performance midbass.

General construction includes a sturdy cast frame, impregnated cloth surround, stable spider and a large central vent channel for reducing long-term heat build-up.

SPECIFICATIONS

Nominal diameter	305 (12)	mm (in)
Nominal impedance	8	Ω
Minimum impedance @ 306 Hz	6.5	Ω
Power handling		
Musical program[1]	1,400	W
AES[2]	700	W
Sensitivity (1W@1m) averaged from 200 to 2,000 Hz	99	dB SPL
Power compression @ 0 dB (nom. power)	3.9	dB
Power compression @ -3 dB (nom. power)/2	2.5	dB
Power compression @ -10 dB (nom. power)/10	0.7	dB
Frequency response @ -10 dB	150 to 4,000	Hz

[1] 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.
[2] AES Standard (150 - 1,500 Hz).

THIELE-SMALL PARAMETERS

Fs	75	Hz
Vas	29 (1.2)	l (ft³)
Qts	0.55	
Qes	0.58	
Qms	10.76	
ηo (half space)	2.20	%
Sd	0.0530 (82.2)	m² (in²)
Vd (Sd x Xmax)	238.5 (14.55)	cm³ (in³)
Xmax (max. excursion (peak) with 10% distortion)	4.5 (1.8)	mm (in)
Xlim (max.excursion (peak) before physical damage)	13.5 (0.53)	mm (in)

Atmospheric conditions at TS parameter measurements:

Temperature	23 (73)	°C (°F)
Atmospheric pressure	1,047	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

βL	16.2	Tm
Flux density	1.06	T
Voice coil diameter	100 (4)	mm (in)
Voice coil winding length	18.0 (50.0)	m (ft)
Wire temperature coefficient of resistance (α25)	0.00410	1/°C
Maximum voice coil operation temperature	320 (608)	°C (°F)
θvc (max.voice coil operation temp./max.power)	0.45 (0.87)	°C/W(°F/W)
Hvc (voice coil winding depth)	17.5 (0.69)	mm (in)
Hag (air gap height)	9,0 (0.35)	mm (in)
Re	5.3	Ω
Mms	62.0 (0.1367)	g (lb)
Cms	60	μm/N
Rms	2.9	kg/s

NON-LINEAR PARAMETERS

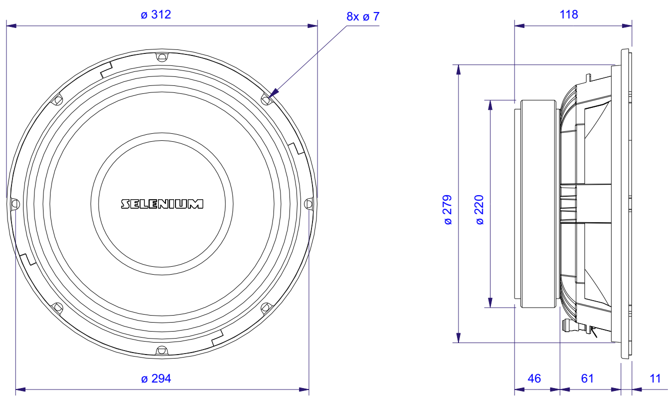
Le @ Fs (voice coil inductance @ Fs)	1.570	mH
Le @ 1 kHz (voice coil inductance @ 1 kHz)	0.543	mH
Le @ 20 kHz (voice coil inductance @ 20 kHz)	0.159	mH
Red @ Fs	0.41	Ω
Red @ 1 kHz	2.41	Ω
Red @ 20 kHz	18.48	Ω
Krm	6.3	mΩ
Kxm	19.6	mH
Erm	0.68	
Exm	0.59	

ADDITIONAL INFORMATION

Magnet material	Barium ferrite	
Magnet weight	3,440 (121.3)	g (oz)
Magnet diameter x depth	220 x 24 (8.67 x 0.95)	mm (in)
Magnetic assembly weight	8,800 (19.40)	g (lb)
Frame material	Aluminum	
Frame finish	Black epoxy	
Voice coil material	Aluminum	
Voice coil former material	Kapton	
Cone material	Long fiber pulp	
Volume displaced by woofer	4.8 (0.169)	l (ft³)
Net weight	9,860 (21.73)	g (lb)
Gross weight	10,680 (23.54)	g (lb)
Packing dimensions (W x D x H)	35,5 x 34,5 x 16 (13.9 x 13,6 x 6,3)	cm (in)

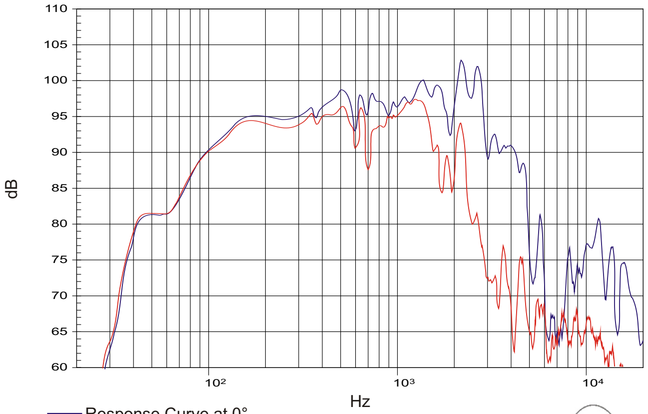
MOUNTING INFORMATION

Number of bolt-holes	8	
Bolt-hole diameter	7.0 (0.28)	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 (10.83)	mm (in)
Connectors	Silver-plated push terminals	
Polarity	Positive voltage applied to the positive terminal (red) gives forward cone motion	
Minimum clearance between the back of the magnetic assembly and the enclosure wall	75 (3)	mm (in)



Dimensions in mm.

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



Response Curve at 0°.
Response Curve at 45°.

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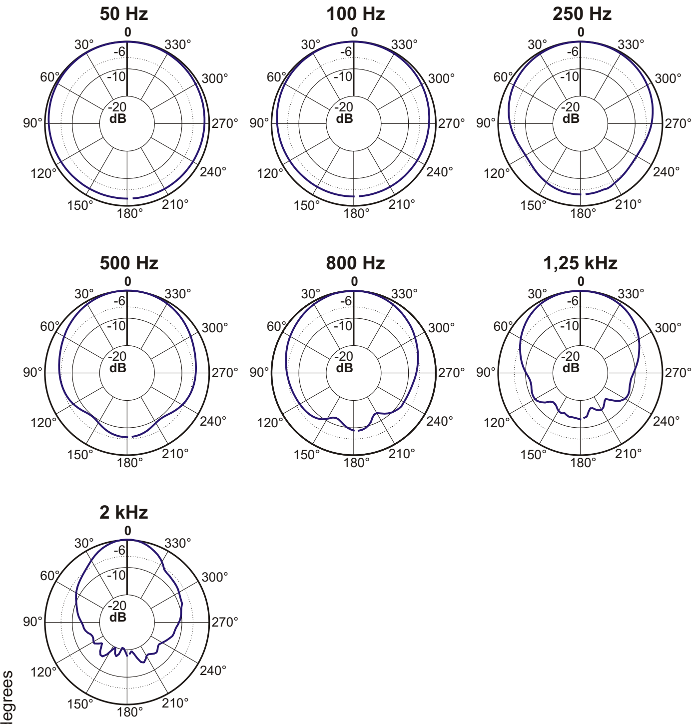
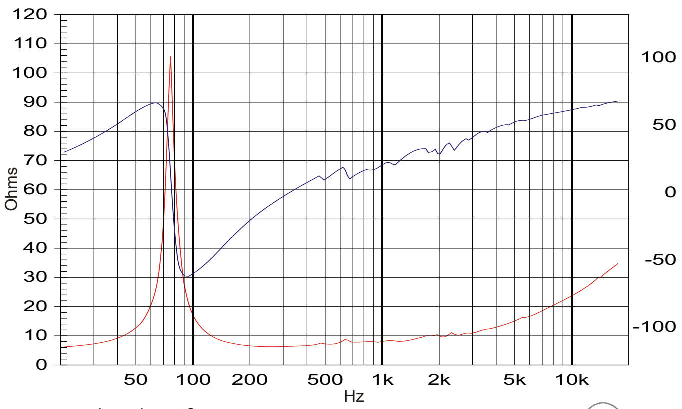
POLAR RESPONSE CURVES



Polar Response Curve.

IMPEDANCE AND PHASE CURVES MEASURED IN FREE-AIR



Impedance Curve.
Phase Curve.

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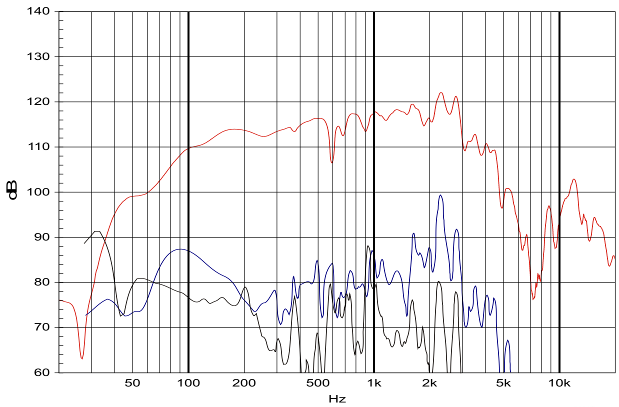
HARMONIC DISTORTION CURVES MEASURED AT 10% AES INPUT POWER, 1 m



Response Curve.
Distortion Curve, 2nd harmonic.
Distortion Curve, 3rd harmonic.

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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.
α_{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 Krm, Kxm, Erm and Exm from an empirical model, we can calculate voice coil impedance with good accuracy.

SUGGESTED PROJECTS

HB1206A1 HB1205A3 HB1205D1 PAS1MA1 PAS2MA1 PAS3MA1
PAS3MA2 PAS4MA1 PAS5MA1
For additional project suggestions, please access our website.

TEST ENCLOSURE

24-liter volume, sealed box.