SELENIUM PRO

WOOFER QCF®
WPU1807 / WPU1807-SLF*

18" Woofer for bass professional sound reinforcement.

Its dust cap and cone are made with Selenium exclusive QCF® (Quartz Composite Fiber), a water and ultra violet resistant material for environments where moisture and radiation are of high consideration.

Offering high power capacity, outstanding low end response and exceptional long term performance, this transducer is ideal for compact woofer enclosures. This woofer exhibits excellent acoustics with work horse construction. Designed for smaller enclosures, the WPU1807 / WPU1807-SLF* is a versatile high performance woofer.

General construction includes a sturdy cast frame, impregnated cloth surround, stable double spider and three extra vent gap holes (in addition to a large central one) in order to reduce long term heat build-up.

*WPU1807-SLF: Product without Selenium logo printed on the dust cap.

SPECIFICATIONS

Nominal diameter	460 (18)	mm (in)
Nominal impedance	8	Ω
Minimum impedance @ 125 Hz	7.8	Ω
Power handling		
Musical program[1]	1,000	W
AES[2]	500	W
Sensitivity (2.83V@1m) averaged from 100 to 500 Hz	96	dB SPL
Power compression @ 0 dB (nom. power)	3.0	dB
Power compression @ -3 dB (nom. power)/2	2.0	dB
Power compression @ -10 dB (nom. power)/10	0.1	dB
Frequency response @ -10 dB	45 to 3,500	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 (60 - 600 Hz).

THIELE-SMALL PARAMETERS

Fs	35	Hz
Vas	265 (9.36)	l (ft³)
Qts	0.43	
Qes	0.43	
Qms	28.13	
ηo (half space)	1.92	%
Sd	0.1194 (185.07)	m² (in²)
Vd (Sd x Xmax)	513.4 (31.33)	cm³ (in³)
Xmax (max. excursion (peak) with 10% distortion)	4.3 (0.17)	mm (in)
Xlim (max.excursion (peak) before physical damage)	10.5 (0.41)	mm (in)

Atmospheric conditions at TS parameter measurements:

Temperature	22 (72)	°C (°F)
Atmospheric pressure	1,023	mb
Humidity	44	%

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

ADDITIONAL PARAMETERS

βL	22.5	Tm
Flux density	1.06	T
Voice coil diameter	100 (4)	mm (in)
Voice coil winding length	29.8 (97.8)	m (ft)
Wire temperature coefficient of resistance (α25)	0.00345	1/°C
Maximum voice coil operation temperature	275 (527)	°C (°F)
θvc (max.voice coil operation temp./max.power)	0.55 (1.05)	°C/W(°F/W)
Hvc (voice coil winding depth)	18.0 (0.71)	mm (in)
Hag (air gap height)	9.5 (0.37)	mm (in)
Re	6.4	Ω
Mms	157.2 (0.35)	g (lb)
Cms	133.3	μm/N
Rms	1.2	kg/s

## NON-LINEAR PARAMETERS

Le @ Fs (voice coil inductance)	9.192	mH
Le @ 1 kHz (voice coil inductance @ 1 kHz)	2.021	mH
Le @ 20 kHz (voice coil inductance @ 20 kHz)	0.523	mH
Red @ Fs	0.51	Ω
Red @ 1 kHz	7.16	Ω
Red @ 20 kHz	76.01	Ω
Krm	7.252	mΩ
Kxm	104.348	mH
Erm	0.788	

ADDITIONAL INFORMATION

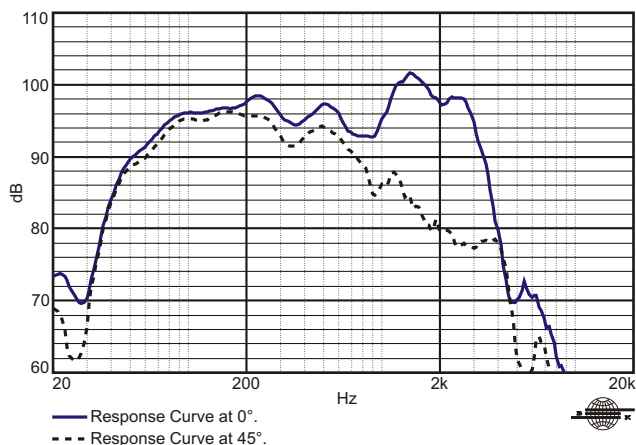|		
Magnet material	Barium ferrite	
Magnet weight	3,440 (120)	g (oz)
Magnet diameter x depth	220 x 24 (8.66 x 0.95)	mm (in)
Magnetic assembly weight	8,440 (18.61)	g (lb)
Frame material	Aluminum	
Frame finish	Black epoxy	
Voice coil material	Copper	
Voice coil former material	Polyimide (Kapton®)	
Cone material	Quartz Composite Fiber (QCF®)	
Volume displaced by woofer	8.5 (0.300)	l (ft³)
Net weight	11,800 (26.01)	g (lb)
Gross weight	12,760 (28.13)	g (lb)
Carton dimensions (W x D x H)	46.5 x 46.5 x 21.5 (18.3 x 18.3 x 8.5)	cm (in)

MOUNTING INFORMATION

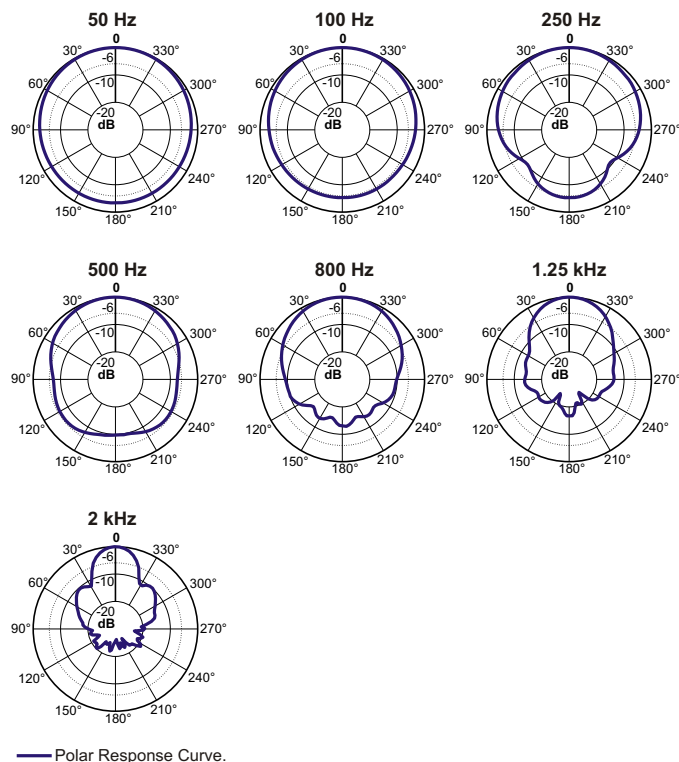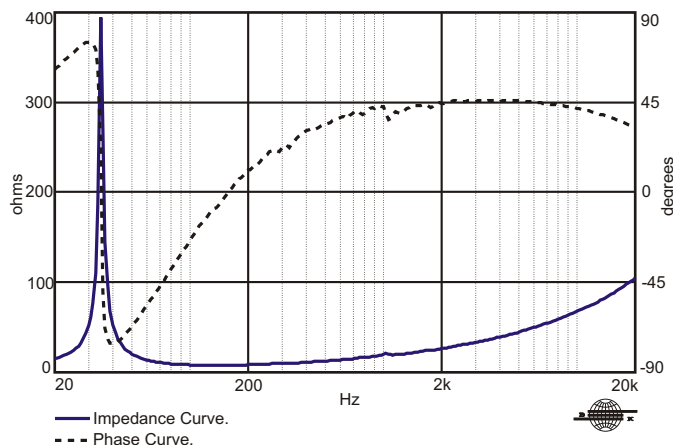|		
Number of bolt-holes	8	
Bolt-hole diameter	7.0 (0.27)	mm (in)
Bolt-circle diameter	439 (17.29)	mm (in)
Baffle cutout diameter (front mount)	422 (16.61)	mm (in)
Baffle cutout diameter (rear mount)	412 (16.22)	mm (in)
Connectors	Silver-plated push terminals	
Polarity	Positive voltage applied to the positive terminal (red) gives forward cone motion	
Minimum clearance between the back of the magnetic assembly and the enclosure wall	75 (3)	mm (in)
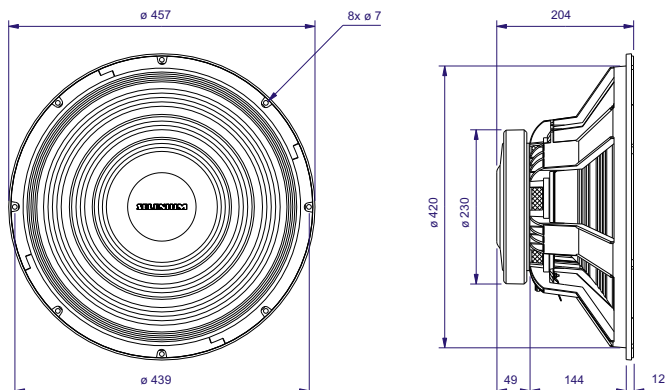
Dimensions in mm.

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

— Response Curve at 0°.
- - - Response Curve at 45°.

IMPEDANCE AND PHASE CURVES MEASURED IN FREE-AIR

— Impedance Curve.
- - - Phase Curve.

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

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

TEST ENCLOSURE
169-liter volume with 2 ducts ø 3" by 0.79" in length.

Kapton®: Du Pont trademark.
QCF® (Quartz Composite Fiber): Selenium trademark.

POLAR RESPONSE CURVES

50 Hz

100 Hz

250 Hz

500 Hz

800 Hz

1.25 kHz

2 kHz

— Polar Response Curve.

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.
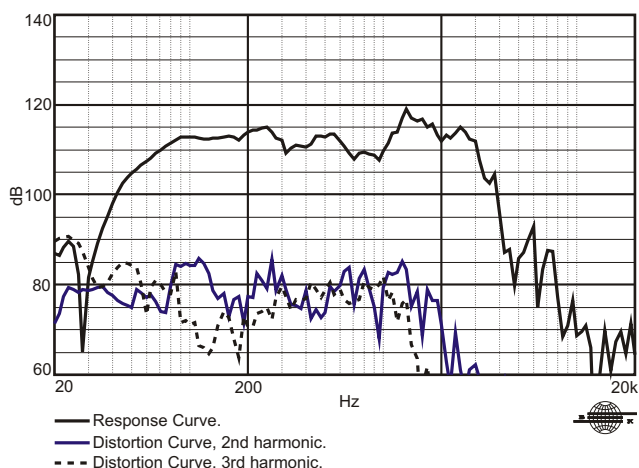
NON-LINEAR VOICE COIL PARAMETERS
Due to its close coupling with the magnetic assembly, the voice coil in electrodynamic loudspeakers is a very non-linear circuit. Using the non-linear modeling parameters Krm, Kxm, Erm and Exm from an empirical model, we can calculate voice coil impedance with good accuracy.

SUGGESTED PROJECTS
HB1805A1   HB1805B1   HB1805C1   VB1805A1   PAS1G1   PAS2G1   PAS3G1
For additional project suggestions, please access our website.

Specifications subject to change without prior notice.

Cod.:152034   Rev.: 03- 01/ 05