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## Loudspeaker Test Report

Manufacturer: Penton (UK) Ltd.

Type: PROJECTOR

Model: CAD20TEN

For: Penton (UK) Ltd.

Report No.: 2004/LS/CAD20TEN

Prepared By: A.N.Stacey, B.Sc., MIOA(E), MinstSCE

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## 1.00 Object

- 1.01 The object of this Report is to present measurements of the acoustic performance of the CAD20TEN device.

## 2.00 Scope

- 2.01 The following characteristics were measured

- On-axis (reference axis) frequency response
- Polar response
- Impedance (Small signal)
- Applied voltage
- On-axis 3<sup>rd</sup> octave band sound pressure level

from which the following are calculated:

- (i) Directivity Index [dB], tabulated and graphical
- (ii) Effective octave and wide band (100Hz to 10kHz) impedance
- (iii) Sensitivity [dB @ 1m,1W]:  
Pink noise  
Speech shape (\*IEC Male)  
(\*BS EN 60268-16:2011)
- (iv) Octave band Sensitivity [dB @ 1m,1W/oct]
- (v) Acoustic Power [dB-PWL @ 1W], tabulated and graphical
- (vi) Octave band Power Apportionment [%]
- (vii) Expected maximum Sound pressure level [dB @ 1m]  
(If extrapolated from a low noise voltage level then power compression is not being considered)
- (viii) Frequency response chart
- (ix) Impedance bode plot
- (x) Polar response charts

### 3.00 Method

- 3.01 The device was mounted in Free Space as shown in figure 1 - Mounting Method E.
- 3.02 The measurements were made in an anechoic chamber.
- 3.03 Measurements were made as detailed in AMS Test Method document No. IR141/LS/Handbook v.1.
- 3.04 All measurements were made in general accordance with BS EN 60268: Part 5: 2003.
- 3.05 The test signal for all sound pressure level measurements was band limited Pink noise (100Hz to 10kHz) with a 6dB Crest factor.

### 4.00 Results

- 4.01 The band limited on-axis 3<sup>rd</sup> octave (100Hz-10kHz) frequency response, Impedance bode plot and Polar plots of the device are shown graphically.
- 4.02 Tabulated values of Directivity Index, Sensitivity, Acoustic Power, Apportioned Power, Impedance and Expected Maximum SPL are shown in the Summary data sheet.
- 4.03 The Directivity Index has been calculated from 412 data points around the directivity balloon.

### 5.00 Notes

#### 5.01 Sensitivity

The octave band sensitivity is produced for calculations. It should be noted that the octave band sensitivity is given as dB @ 1m with 1W in each octave band. For more detailed information, refer to AMS Acoustics Data Sheet 'Loudspeaker Sensitivity – Interpretation of Results'. Note that the octave band and wide band sensitivity levels are with reference to the 'Rated' impedance value.

#### 5.02 Polar Plots

For convenience, each polar plot has been normalized to 0dB. For this reason, caution is advised when comparison of levels between octave bands are made. The reference axis frequency response should be used for comparison purposes.

## 6.00 Engineers Notes & Observations

The reference point is located at the geometric centre of the loudspeaker enclosure in line with the mounting bolts.

The reference axis was made normal to the loudspeaker grille and includes the reference point.

The impedance does not fall below 80% of the rated impedance within the frequency range 89Hz to 11.2kHz.

### Loudspeaker Information

Manufacturer : Penton (UK) Ltd.  
Model Code : CAD20TEN  
Type : PROJECTOR  
Colour : WHITE  
Serial No. : EN54-24 Compliant  
Batch No. : -  
Other Markings : -  
Backbox : As supplied  
Grille : As supplied  
Weight (grams) : 1760  
Depth (mm) : 212  
Width (mm) : 138  
Height (mm) : 138  
Special Features : (0359-CPR-00287)

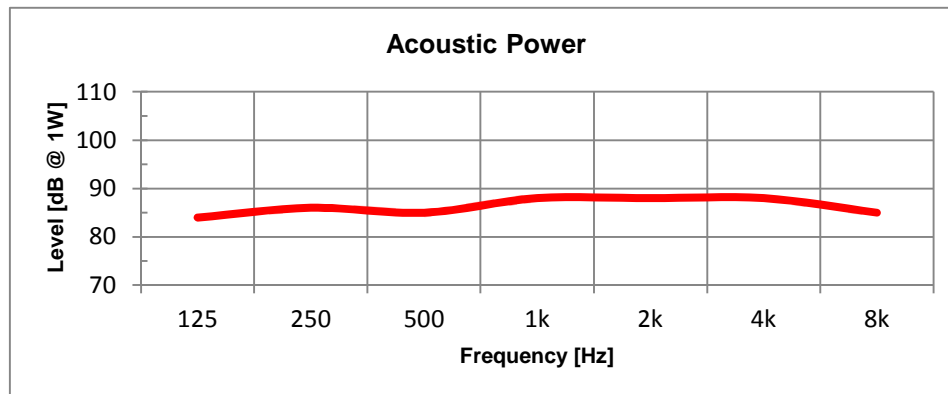
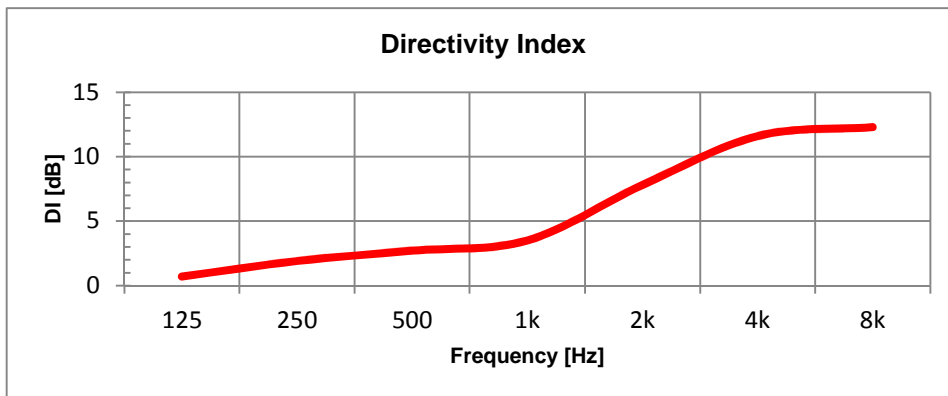
#### Internal Details

Driver Types/Sizes : N/M  
Driver Serial No.(s) : N/M  
Driver Markings : N/M  
Damping Material : NONE  
Available Tappings : 20W, 10W, 5W, 2.5W (100V)

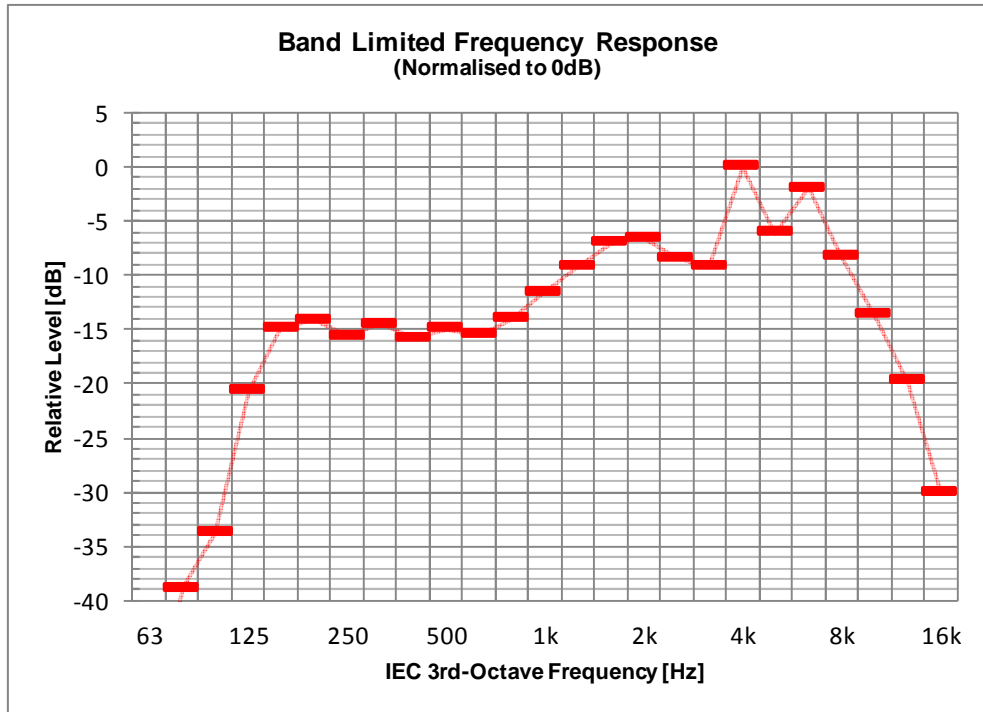
*NM = Not Measured, NA = Not Applicable*

Manufacturer : Penton (UK) Ltd.  
 Model Code : CAD20TEN  
 Mounting : Turntable  
 Measurement Distance [m] : 2.28  
 Test Voltage [V] : 48.30  
 Rated Noise Voltage [V] : 100.00  
 Rated Noise Power [W] : 20.00  
 Rated Impedance [Ohms] : 500.0  
 Minimum Impedance [Ohms] : 478.5 (96% of Rated)  
 Effective Impedance (Pink noise) [Ohms] : 620.5 (PF=0.986)  
 Effective Impedance (IEC Male) [Ohms] : 590.1 (PF=0.977)  
 Reference Axis Located at : 0 degrees

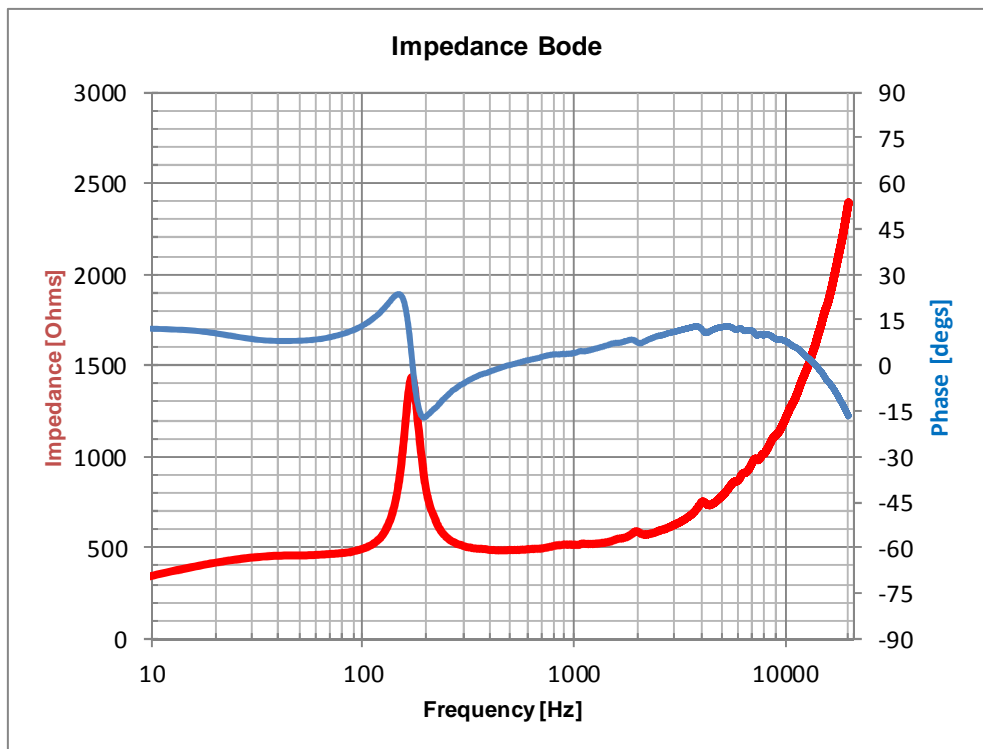
Parameter	Frequency [Hz]							dB	dBA
	125	250	500	1k	2k	4k	8k		
Directivity Index [dB on-axis]	0.7	1.9	2.7	3.5	7.8	11.6	12.3		
Sensitivity [dB @ 1m,1W]	73	77	77	81	85	89	86	92	93
Sensitivity, IEC Male [dB @ 1m,1W]	79	82	77	75	73	71	63	85	81
Acoustic Power [dB-PWL @ 1W]	84	86	85	88	88	88	85		
Apportioned Power [%]	11	13	17	17	16	13	9		
Effective Impedance [Ohms]	631	607	490	516	570	711	1021		
Oct' Sensitivity [dB @ 1m,1W/Oct]	83	87	86	90	94	98	96		
Expected Maximum SPL [dB @ 1m]	86	90	90	94	98	102	99	105	106



# CAD20TEN



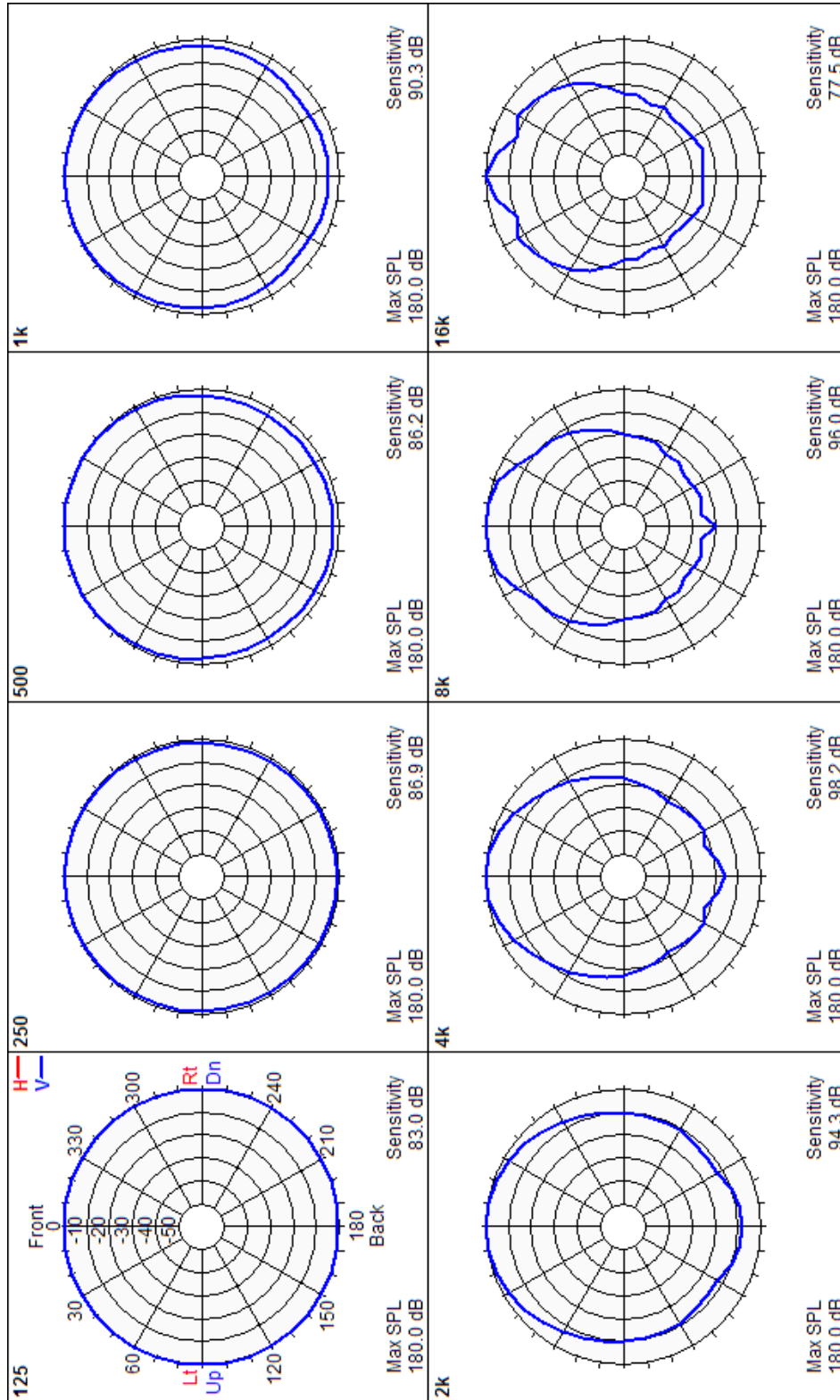
Test signal: Pink noise-6dBCF (100Hz-10kHz)



@ 20W

Test signal : Swept sine wave

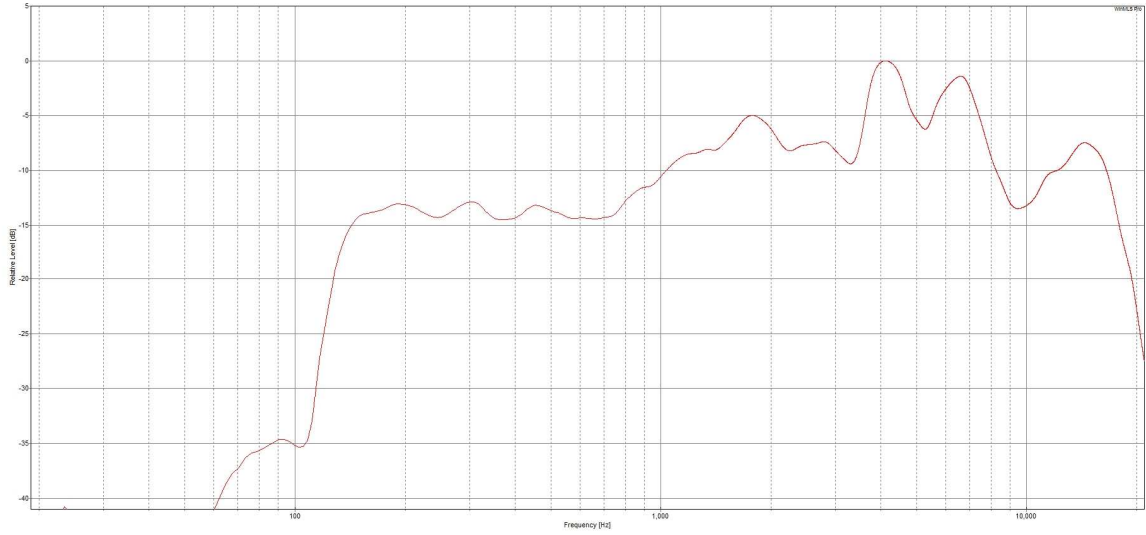
CAD20TEN





## CAD20TEN


Frequency response



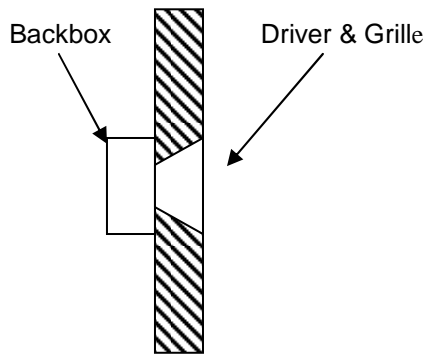
*Note:* The frequency response is derived using a Swept sine method.



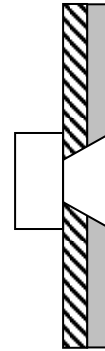
Signed: 

Countersigned: 

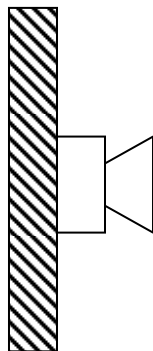
## Loudspeaker Mounting Methods



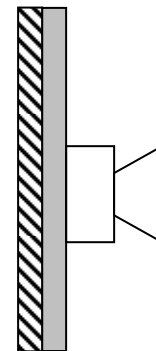
**Mounting Method A**  
Loudspeaker Mounted  
in a Reflective Baffle



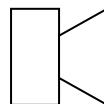
**Mounting Method B**  
Loudspeaker Mounted  
in an Absorbent Baffle



**Mounting Method C**  
Loudspeaker Mounted  
on a Reflective Baffle



**Mounting Method B**  
Loudspeaker Mounted  
on an Absorbent Baffle



**Mounting Method E**  
Loudspeaker not Attached to any  
Surface and Radiation Unaffected  
by nearby Reflecting Surfaces

Figure 1