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TECHNICAL BULLETIN

CB APPLICATION NOTES

The object of this report is to enable the user to obtain the best possible results for his application using a CB device. Because of the particular conditions, such as circuitry and housing, it may be necessary to deviate from the Standard Conditions. This report shows the effects of such deviations.

The CB has been designed to be used in the following way in order to meet the published performance specification. These parameters will be refered to as Standard.

Fig. 1.

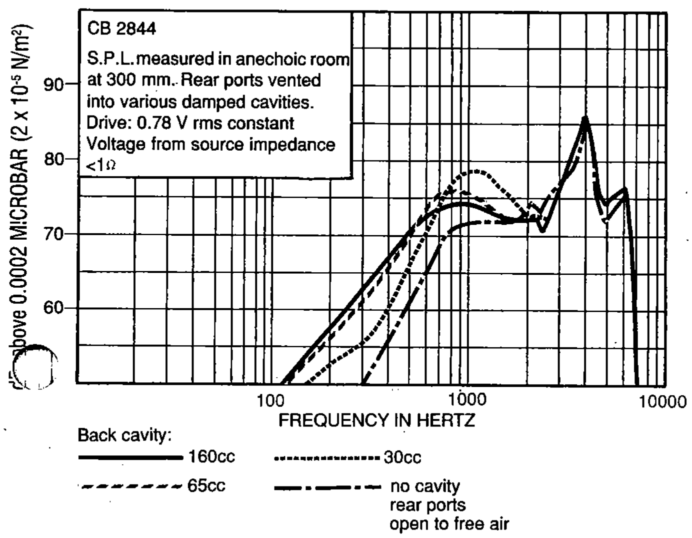
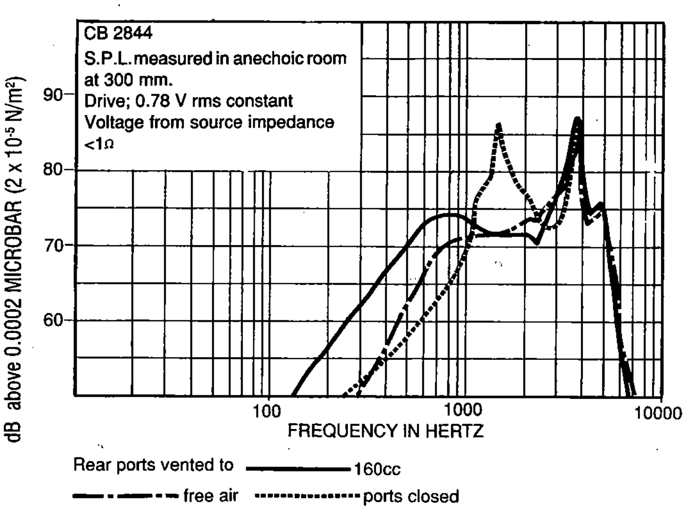


Fig. 2.



STANDARD TEST CONDITIONS

Drive: 50m W measured at 1 KHz Constant Voltage from a low impedance source. The signal which contains little or no d.c. is applied across the outer pins.

Rear Ports: Vented to a 160 cc cavity damped with cotton wool or similar material.

Sound Pressure Level: measured at 300mm in an anechoic room.

The data which follows refers to the CB 2844 but the principles involved apply to all models.

ACOUSTIC LOADING

Figure 1 shows the effect of venting the rear ports into various cavities. Figure 2 shows the unit with rear ports vented to 160cc compared with the unit freely suspended with rear ports open and closed. This must be taken into account when designing the housing for the CB and associated circuitry. If a good seal has not been provided around the unit to acoustically isolate the front ports from the back ports, the effect of the cavity will be modified. The main effect will be an overall loss in sound output level. It is therefore recommended that some form of rubber gasket be used around the device. As it is adviseable to mount the unit using some sort of resilient material this can often be incorporated with the sealing gasket in some form of rubber boot designed to suit the users housing.

KNOWLES ELECTRONICS, INC.
1151 Maplewood Drive,
Itasca, Illinois 60143, U.S.A.
Phone: (708) 250-5100
Fax: (708) 250-0575

KNOWLES ELECTRONICS CO.
73 Victoria Road, Burgess Hill,
West Sussex. RH15 9LP, England.
Phone: (0444) 235432
Fax: (0444) 248724

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DRIVE CONDITIONS

In practice the circuit used to drive the device may not give a constant voltage drive from a low impedance source. Figure 3 shows the effect on Sound Pressure Level of driving from various source impedances. Figure 4 shows the effect on power into the unit, assuming that

$$\text{Power} = \frac{(\text{R.M.S. Volts across unit})^2}{\text{Impedance}}$$

The impedance varies with frequency as shown in Figure 5.

From Figure 6 it can be seen that unless the drive to the device is limited at low frequencies acoustic overload could be a problem. Power ratings here are assuming,

$$\text{Power} = \frac{(\text{R.M.S. Volts across unit})^2}{\text{Nominal Impedance}}$$

Fig. 3.

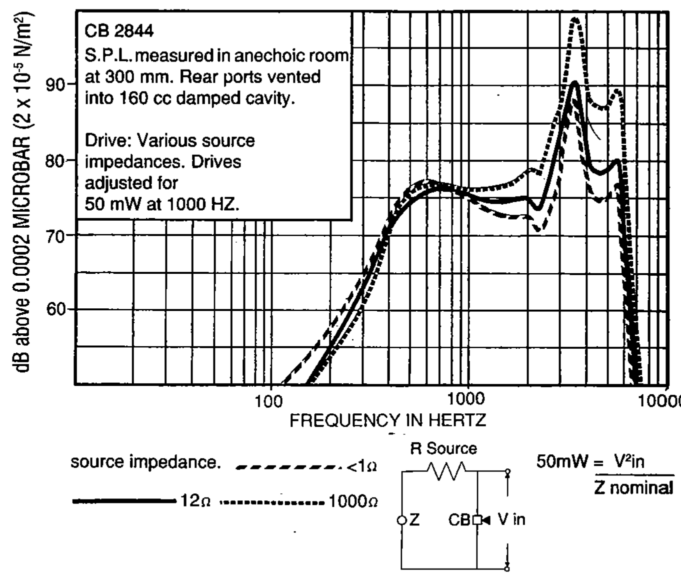

Fig. 4.

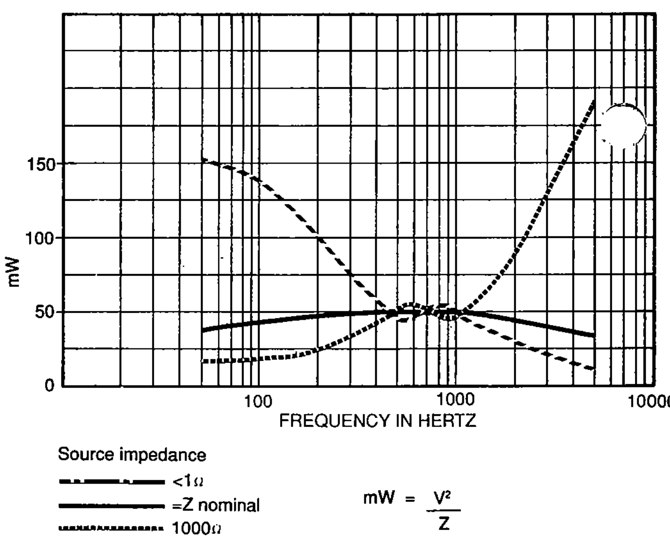

Fig. 5.

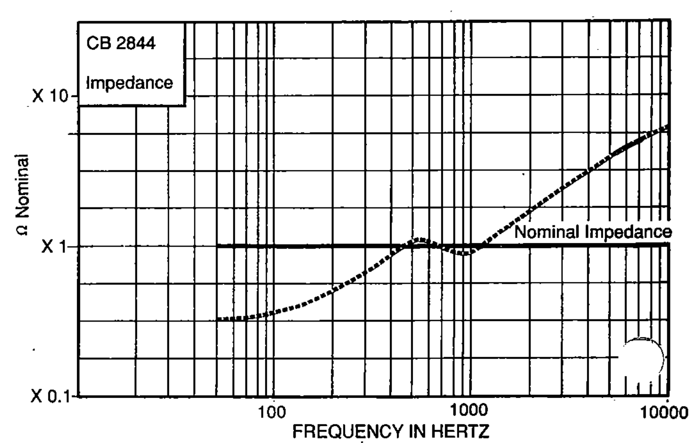

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Fig. 6.

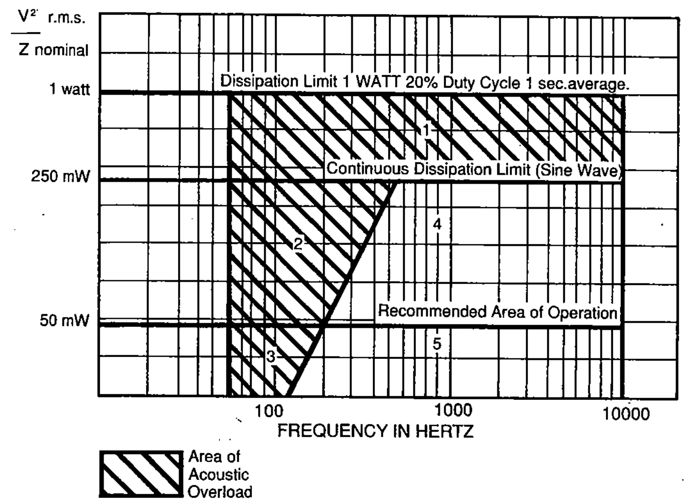


Fig. 7.

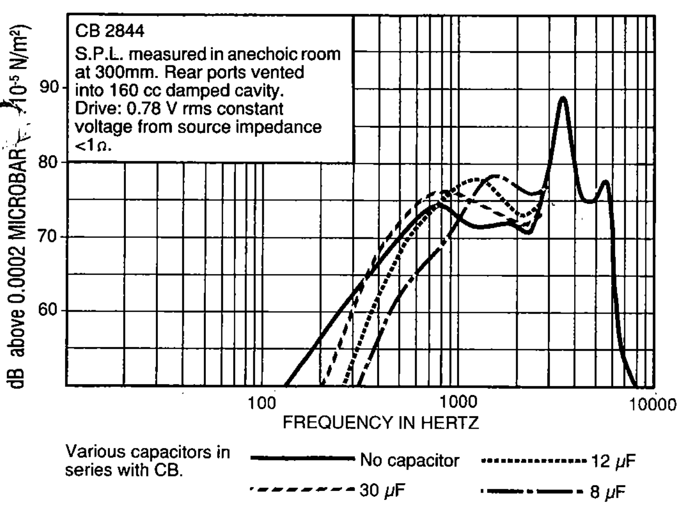
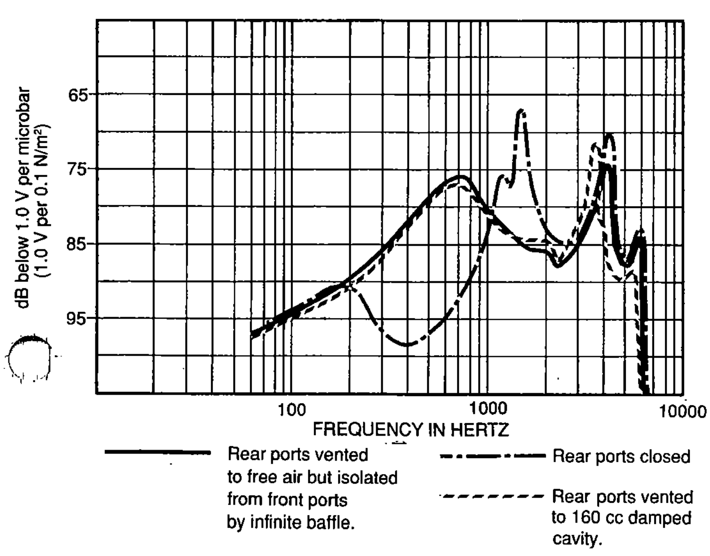


Fig. 8.



Corrections could be made if required using Figure 5, and Figure 4 can be used to indicate the drive power. It may be necessary to limit the low frequency drive either in the amplifier or with a capacitor or resistor in series with the unit. See Figure 7. A capacitor in series does also give a mid frequency boost. For values of capacitor for other impedance models,

$$C = C_{quoted} \times \frac{12}{\text{New Nominal Impedance}}$$

Looking at Figure 6, areas 1, 2, and 3 are areas of high acoustic overload and should be avoided if possible. Area 1 should only be used with a 20% duty cycle for an average of 1 second, and the source resistance equal or greater than Nominal Impedance.

Area 2 can be used for continuous sine wave dissipation with the source resistance equal or greater than the Nominal Impedance.

Area 3 the source resistance is not critical.

Area 4 is in excess of the recommended drive and may at certain frequencies have areas of acoustic overload. This will vary with the method of mounting and housing the unit. This could still be considered as an area of good intelligibility.

The source resistor is not important.

Area 5 is the recommended area of operation and the source resistor is not important.

USE AS A MICROPHONE

Figure 8 shows the sensitivity of the device when used as a microphone with the rear ports vented to an infinite cavity, vented to 160 cc damped cavity, and rear ports closed. (The infinite cavity situation is where the front ports are acoustically isolated from the rear ports, i.e. with a large baffle.) The sensitivity was measured into an open circuit. The unit can be used as a close-talking noise cancelling microphone with the rear ports left open to free air. The noise cancelling response depends very much on the mechanical configuration of the microphone mounting and therefore the response has not been shown.