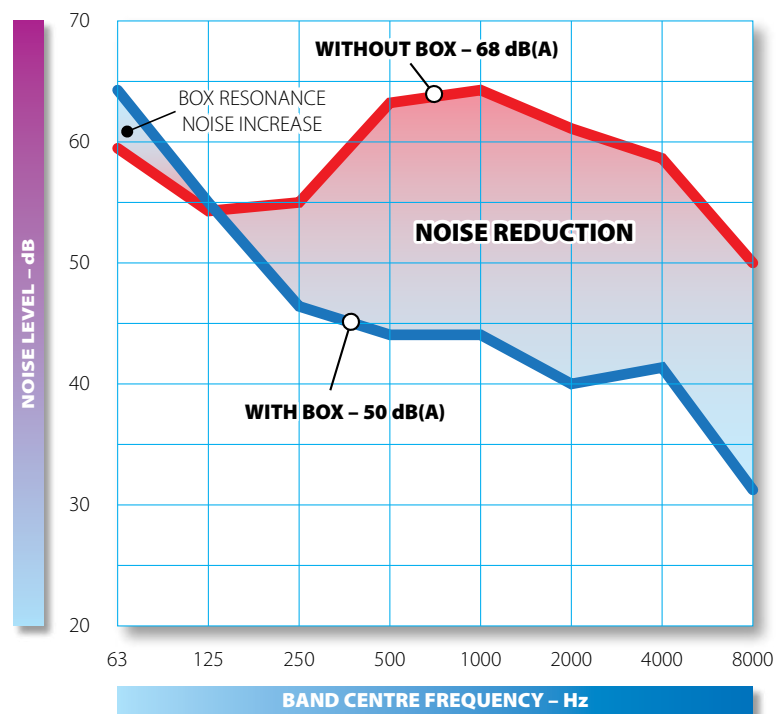


ACOUSTIC REPORT

The Filter Box Company has been quietening pool filtration equipment for 25 years. Neatly.

The following Acoustic Engineers Report shows a noise level reduction of **18 dB(A)*** measured just one metre from the box.



REPORT No. 1366 - 3

* Result achieved using a standard Filter Box enclosure.

Tested by Day Design Pty Ltd



1.0 ENGINEERING BRIEF

Day Design Pty Ltd was commissioned by The Filter Box Company to measure the noise reduction of their standard ventilated filter pump enclosure.

2.0 DESCRIPTION OF TEST SITE AND TEST METHOD

A typical swimming pool filter pump was located on a concrete slab foundation between a pool wall and a brush fence, as shown on our Drawing A4-1366-1. The enclosure was located over the filter pump on closed cell foam strips to seal any possible gaps at the bottom.

In the absence of any specific standards for enclosure noise reduction measurements, AS 1217.7-1985 "Acoustic - Determination of Sound Power Levels of Noise Sources, Part 7 - Survey Method" was adopted. The Noise Reduction is the difference between the sound power level for the pool filter pump with and without the enclosure. However, the measurements were taken with the microphone located at the same positions which means that the noise reduction is equal to the difference between the mean sound pressure levels measured with and without the enclosure.

The location of measuring positions are shown in Drawing A4-1366-1.

The Filter Box was of standard construction installed in a standard manner around a typical swimming pool filter pump set. The box was of corrosion resistant galvanised sheet steel construction, lined with flame-retardant sound absorbing material. Natural ventilation openings that will allow air to pass through the enclosure and cool the motor were acoustically treated to minimise the emission of noise. The base of the metal enclosure was sealed to the filter pump base using a foam strip to minimise noise emission.

The detailed construction of the Filter Box is provided in the attached Confidential Appendix "A". Copies of this report may be distributed without the Confidential Appendix "A".

3.0 NOISE SURVEY INSTRUMENTATION

All noise measurements were made with Bruel & Kjaer instrumentation as follows:

Description	Model No.	Serial No.
Precision Integrating Sound Level Meter	2230	1 033 370
Condenser Microphone	4155	1 040 310
Band Pass Filter	1625	1 032 884
Calibrator	4230	1 058 704

The instrumentation system was laboratory calibrated and certified by Bruel & Kjaer (Aust.) Pty Ltd to conform to N.A.T.A. specifications within the last year. Field calibrations were also carried out before and after each set of measurements and instrument drift was found to be less than 0.2 dB and therefore acceptable.

4.0 MEASURED NOISE REDUCTION LEVELS

Sound pressure level readings were taken at each of five positions around the filter pump, with and without the enclosure. Where levels were within 5 to 10 dB(A) of the background noise level corrections were made and the noise reductions were calculated as scheduled below in Table 1.

TABLE 1

Position	Noise Reduction – dB								
	dB(A)	63	125	250	500	1k	2k	4k	8k
1	17	-6	-2	7	19	20	22	14	20
2	18	-7	-1	8	17	22	22	16	16
3	18	-9	0	8	20	21	21	17	21
4	19	-6	0	9	19	20	23	17	21
5	20	-6	-2	6	17	22	24	19	17
Mean	18	-6	-1	8	19	20	22	16	18

5.0 CERTIFIED NOISE REDUCTION

We hereby certify that the mean measured noise reduction of the pool filter pump enclosure fitted around a typical swimming pool filter pump according to the manufacturer's instructions was 18 dB(A).

REPORT BY:  W. Tony Reflinski, B.E. (Nav. Arch.), MIE Aust.
Consulting Acoustical Engineer
DATE ISSUED: 16 March, 1988

6.0 MEASURED NOISE LEVELS

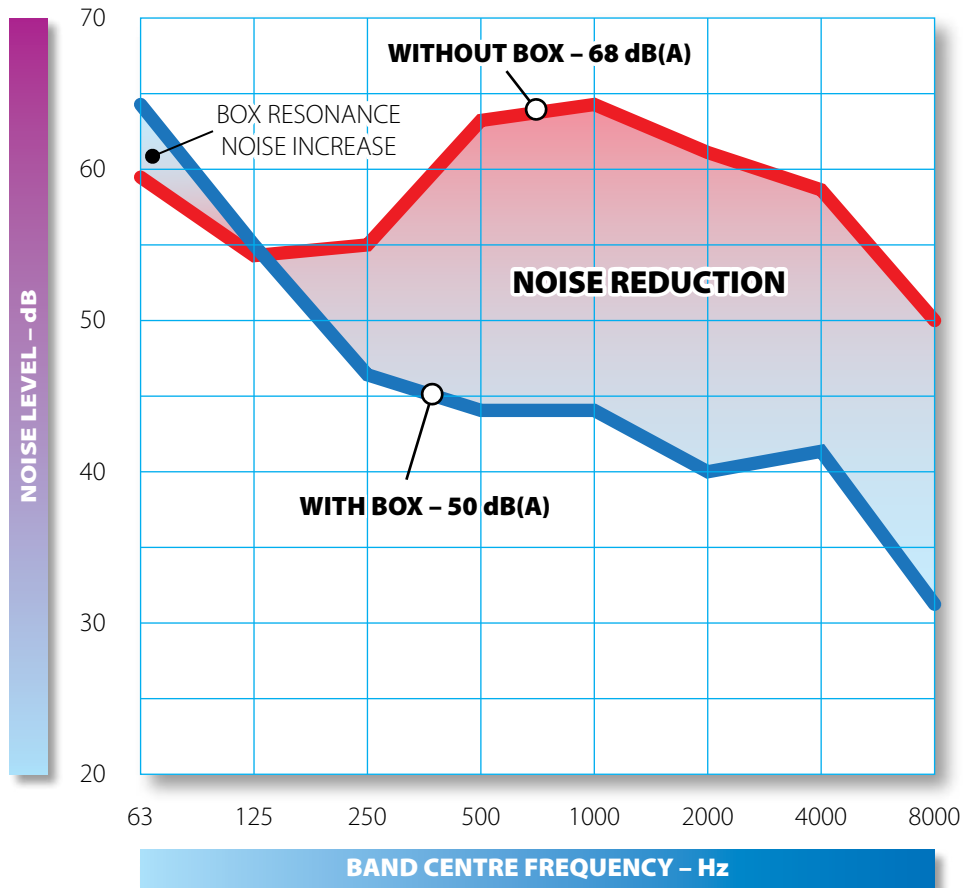
The logarithmic mean of the sound pressure levels measured at positions 1 to 5 around the swimming pool filter pump were:

Without enclosure: 68 dB(A)
 With enclosure: 50 dB(A)
Noise reduction: 18 dB(A)

7.0 LOW FREQUENCY NOISE INCREASE

The Noise Reduction in octave bands given in Table 1, Section 4.0 of this report shows a -6 and -1 dB reduction at 63 and 125 Hz respectively. This means that the noise is actually increased at these frequencies due to low frequency resonance of the side panels. This phenomena is illustrated in Figure 1 below.

FIGURE 1



It is apparent from Figure 1 that the unsilenced swimming pool filter/pump is of predominantly high frequency (500 to 4000 Hz) spectral distribution, and that the Filter Box acoustic enclosure is designed to selectively attenuate this type of noise. The small amount of resonant noise generation at the low frequencies does not significantly affect the dB(A) noise reduction, and is subjectively of no importance.

ADDENDUM TO REPORT BY: *Athol Day* Athol Day, MSc (Acoustics), MIE Aust. MAAS
 Consulting Acoustical Engineer
 DATE ISSUED: 8 April, 1988

DAY DESIGN PTY LTD
 CONSULTING ACOUSTICAL AND MECHANICAL ENGINEERS

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