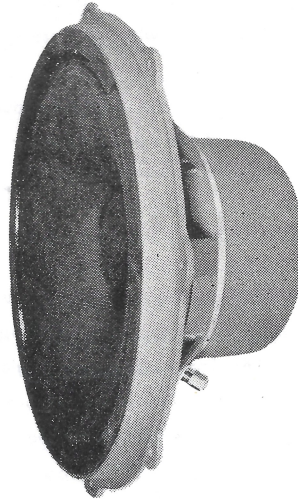


pioneer

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PW-25C

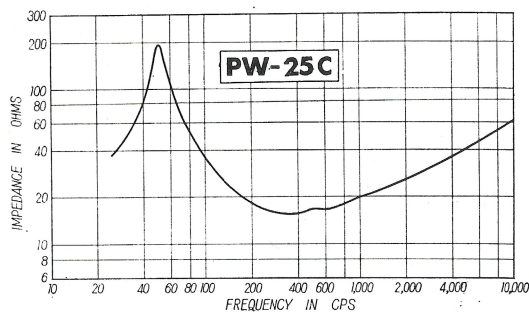
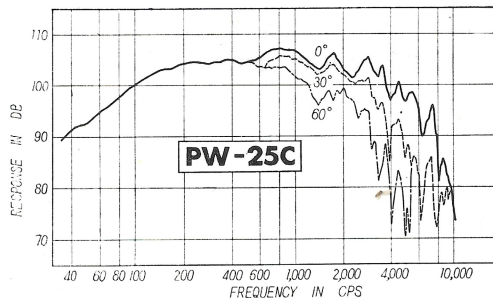
10-INCH WOOFER

The **PW-25C** is a 10" low frequency woofer unit suitable for use in better quality home stereophonic systems, or in sound systems for small auditoriums. Compared to the 10" speakers manufactured heretofore, it is equipped with a far superior magnetic field and yoke, so it is extremely efficient, and enables the user to enjoy clean well-damped low frequency reproduction. The tonal quality of the **PW-25C** is excellent not only in the low frequencies but in the 250 cps to 1,000 cps frequency range, that comprises the basis of musical sounds, and so it therefore provides clean and crisp reproduction of music, particularly piano music. The Qe factor of the speaker itself is low, so a small and compact bass reflex enclosure will suffice for the **PW-25C** without any impairing of its excellent low frequency reproduction. This means that not much space will be taken up even when two units are placed in a single room in a stereophonic system. The **PW-25C** is equipped with two sets of mounting bolt holes, one set that conforms to JIS (Japan Industrial Standards) specifications, and the other that extends due consideration to the cavity effects of the front of the speaker. For two-way or three-way systems, PIONEER strongly recommends use of the **PW-25C**.



SPECIFICATIONS

Model No.	PW-25C
Voice Coil Impedance	8 or 16 ohms
Resonant Frequency	40-55 cps
Frequency Range	35-4,000 cps
Maximum Power Input	15 watts
Sensitivity	103 db/watt
Total Flux	160,000 maxwell
Flux Density	10,200 gauss
Equivalent Mass	20 g
Diameter	286 $\frac{m}{m}$ (11 $\frac{1}{4}$ inch)
Depth	119 $\frac{m}{m}$ (4 $\frac{3}{4}$ inch)
Mounting Diameter	259 $\frac{m}{m}$ (10 $\frac{1}{4}$ inch)
	220 $\frac{m}{m}$ (8 $\frac{11}{16}$ inch)
Weight	4.2kg (9.3 lbs)



FUKUIN ELECTRIC WORKS, LTD.

USES OF PW-25C

The **PW-25C** is a loudspeaker designed specifically for low frequency reproduction. In addition to the fact that it is a handy 10" size speaker, it boasts a high efficiency factor. Moreover, it performs superbly even in a small enclosure, so it is ideal for those who find the low frequency response of an 8" speaker inadequate, or for those who wish to assemble a high quality stereophonic system.

1. 45/45 stereophonic record reproduction; high quality playback of long-playing microgroove records;
2. Reproduction of FM high fidelity broadcasts;
3. Sound systems for record concerts;
4. Restaurants or nightclubs;
5. Sound systems in theaters, motion picture houses, or public auditoriums;
6. Monitoring in broadcasting facilities or recording studios;
7. Juke boxes;
8. Testing and examining of all types of audio components.

OUTSTANDING FEATURES OF MULTI-WAY SYSTEMS

1. Extension of the range of frequency reproduction is simplified, while the overall response becomes far smoother than systems using single speakers.
2. Sound distribution is vastly improved over that of single unit speaker systems, and the overall quality is less mechanical and becomes abundant in 'living presence'.
3. Intermodulation distortion or interference distortion-

that serve to impair tonal quality-can be minimized.

4. As the frequency range handled by each individual unit is far less than that handled by a single unit speaker system, the designing is greatly simplified, and it becomes possible to use units with optimum frequency response, transient characteristics, and efficiency factors for the specific range, so the result is outstanding overall characteristics.

FEATURES OF PW-25C

1. HIGH FREQUENCY RESPONSE & DISPERSIONAL CHARACTERISTICS IDEAL FOR MULTI-WAY SYSTEMS

A loudspeaker meant especially for good low frequency reproduction should of course provide faithful low frequency response, and have a sharply attenuating high frequency response. With the **PW-25C**, the response of the frequencies above 3,000 cps drops off sharply, so its overall characteristics are ideal for use in a two-way or three-way system. Also, the dispersional characteristics are superior to those of large diameter woofers, so it is possible to obtain outstanding results particularly when the **PW-25C** is used in two-way systems. Mid-range response is outstanding, and there is none of the lack of mid-range reproduction that is so liable to arise when a large diameter woofer is used in a two-way system. The crossover frequencies should be set at 3,000 cps when it is to be used in a two-way system, and anywhere from 600 cps to 800 cps when it is to be

used in a three-way system.

2. EFFICIENCY-TRANSIENT RESPONSE-LOW FREQUENCY RESPONSE

The efficiency and transient response of low frequency speakers can be ascertained by the response of the lower frequencies. The response of the **PW-25C** starts falling off smoothly from around 200 cps, and at the resonance point (f_0), it is far lower than the average sound level. Speakers that have such response curves have high efficiency factors and excellent transient response. The Q_e of the **PW-25C** is in the vicinity of 0.3-0.5. To design an ideal bass reflex enclosure, the Q_e should be less than $1/\sqrt{3}$; hence, since the Q_e of the **PW-25C** is less than this figure, when mounted in a bass reflex type enclosure the attenuation of the low frequencies is adequately compensated for, and the overall response is essentially flat down as far as the f_0 .

3. RELATIONSHIP BETWEEN LOW FREQUENCY RESPONSE OF SPEAKER & THE AMPLIFIER

The frequency response shown in the catalogs are the curves obtained by measurements made in accordance with JIS specifications. However, the actual low frequency response is determined by the relationship between three factors, i. e., the Q_e of the speaker, the enclosure, and the amplifier. In designing a bass reflex type enclosure, it is customary to design it so that when the speaker is mounted within the enclosure, a Q factor of 1 is obtained. In such cases, the internal resistance of the amplifier should be zero. In other words, an amplifier with a large amount of negative feedback and a high damping factor is desirable. In order to obtain a Q factor of 1 using an infinite baffle type enclosure, calculations based on the specifications of the **PW-25C** produce a damping factor of 0.6. Therefore, when using an infinite baffle type enclosure, it will be seen that superb low frequency response can be obtained even when an amplifier with a poor damping factor is used. In such instances, the attenuated portion of the low frequencies is boosted, and response that is essentially flat down as far as the f_0 is obtained. When an amplifier with a high damping factor and an infinite baffle are used, the low frequencies will be attenuated, and the overall response will become closer to the response obtained when the speaker is measured out in an anechoic chamber. However, in actual use, when used in the home, because of the effects of the walls, the floor, or the corners of the room, the low frequencies will not response curve, so there is no worry of inadequate low frequency response. If low frequency response should seem insufficient in actual practice, suitable adjustments should be made by means of the tone controls of the amplifier.

4. LARGE POWER HANDLING CAPACITY

The power handling capacities of the average 10" speakers manufactured up to now have generally been in the vicinity of 10 watts or so. However, through the use of an exceptionally powerful magnetic field and an extra large voice coil, the power handling capacity of the **PW-25C** has been boosted to 15 watts. This means that it is ideally suited for use in conjunction with amplifiers with outputs of 7 to 15 watts that are just about the right size for home high fidelity applications. Not only has the efficiency been boosted, but the power

handling capacity has been increased over past models, so the overall result is that the sound level is several times higher than that of similar size speakers.

5. ELIMINATION OF NON-LINEAR DISTORTION

Distortion is caused by many factors, but among the various forms of distortion, the most prominent is the non-linear distortion caused by uneven distribution of the magnetic flux within the magnetic field.

As frequencies get lower, the amplitude of the voice coil movements gets larger and larger—in inverse proportion to the square of the frequency—so as a result, severe non-linear distortion is liable to arise in the low frequencies. In designing the **PW-25C** the flux distribution was measured precisely, and a magnetic field construction providing a minimum of unbalance in the flux distribution was adopted so that the driving power working on the voice coil remains constant at all times, with the result that distortion from this section is kept at an extremely low figure. In addition, the damper—which is another source of non-linear distortion—is comprised of a large circular corrugated damper of a size unseen in the past in speakers of this size, so that not only is the centering of the voice coil ensured at all times but exceptional care is paid to the prevention of distortion caused by non-linearity of the movements of the damper.

6. CAN BE USED IN SMALL ENCLOSURES

The Q_e of the **PW-25C** is low, while it has excellent transient response, hence, the enclosure can be small and compact without any deterioration of the characteristics or response.

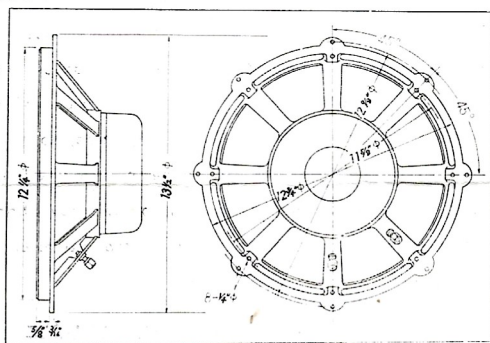
(1) In designing an infinite baffle enclosure, up to the point where the Q reaches 1, the desired low frequency response curve can be obtained at will by varying the dimensions of the enclosure. Moreover, to attain a given low frequency response curve, an enclosure with a capacity that is smaller than that required for similar size speakers will suffice.

(2) When properly designed, a bass-reflex enclosure that is considerably smaller than in infinite baffle enclosure producing the same results will suffice. Superb low frequency response can be obtained even if the capacity of the enclosure is smaller than that required for a speaker with a high Q_e factor; an enclosure about the size of those generally used for 8" speakers is adequate.

INSTRUCTIONS FOR USE

Mounting

Unlike other speakers manufactured heretofore, the **PW-25C** is equipped with an extra set of mounting holes, in addition to those prescribed by JIS requirements. When this extra set of mounting holes is used, not only can full play be given to the baffle effects, but it becomes possible to prevent deterioration of the dispersion of the high frequencies. The dimensions of these holes are as shown in the illustration below. When mounting the speaker, the edges of the frame of the speaker should be placed in a countersunk ridge mounting prepared on the front of the baffle board, and the speaker secured in position by using the outer mounting holes. Please be careful to see that the wire netting on the speaker nameplate is not covered up.

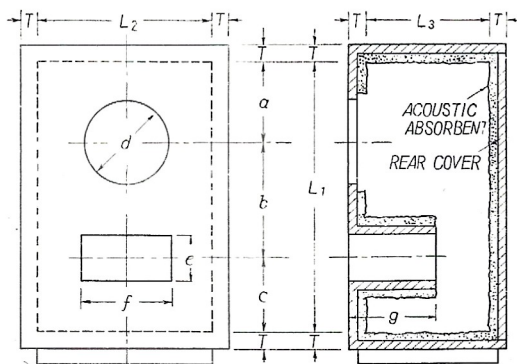


Enclosure

The material to be used in making a good enclosure should be heavy plywood, hardwood, or composite boards, at least an inch in thickness. The internal surfaces should be covered with felt secured in undulating form, and the enclosure should be reinforced with stays and props to prevent standing waves and enclosure resonance. The ideal dimensions for the two types of enclosure that are used widely today, i. e., the infinite baffle enclosure and the bass reflex enclosure, are as follows.

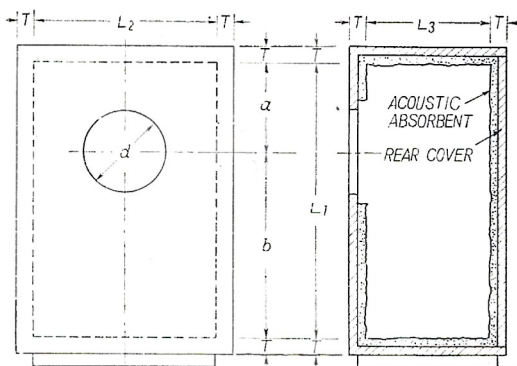
The dimensions for the infinite baffle type enclosure shown here are the dimensions required to achieve a frequency response that is similar to that achieved when the speaker is mounted on an infinite baffle board. If

space is limited, the enclosure can be made a little smaller, but in such cases, the resonance of the speaker when mounted in the enclosure may rise slightly. The dimensions given for a bass-reflex type enclosure provide essentially flat response down to the f_0 point, and will produce full and rich bass tones in abundance.



Dimensions of Bass Reflex Type Enclosure

L_1	L_2	L_3	a	b	c	d	e	f	g
27 1/2"	19 1/16"	13 3/8"	8 11/16"	12 7/16"	6 1/2"	10 3/4"	6 5/16"	10 1/4"	8 1/2"



Dimensions of Infinito Baffle Type Enclosure

L_1	L_2	L_3	a	b	d
34 5/8"	24 13/16"	15 3/4"	13 3/4"	20 7/8"	10 1/4"

NOTE: When designing a corner type enclosure, the overall shape may be varied provided the internal volume of the enclosure kept the same. (FE-03F01T)