

FIG. 11. ABSORPTION PLENUMS WITH AND WITHOUT SOUND CELLS

on the fan discharge as shown in Fig. 11 will often prove the most economical arrangement. The absorption in the plenum may be approximated by Equation 23.

$$\text{db (Attenuation)} = 10 \log_{10} \frac{\text{Plenum Absorption in Sabins}}{\text{Area Fan Discharge}} \qquad (23)$$

The area of the plenum should be at least ten times as great as the fan discharge area. The plenum should be lined with 2 in. of muslin covered rock wool blanket, or 1 in. sound absorbing board preferably nailed to wood strips on the inside of the plenum. With such a lining the plenum is particularly effective in reducing low frequency fan noise. The absorption of the plenum in sabins is the sum of the products of each interior area of the plenum measured in square feet multiplied by its corresponding absorption coefficient.

Outlet Sound Absorbers

Outlet sound absorbers are rectangular or plate cells installed directly behind an outlet or they may be the lining of a pan or plaque outlet. They are particularly effective in the elimination of high frequency whistles which are generated by air flow in the ducts. They are also employed in large systems with long runs where only a few outlets near the fan require treatment. Frequently outlet cells are the only means of correcting existing noisy installations, as the duct sections directly behind the outlets may be the only sections accessible for treatment. (See Fig. 12).

Package Units

Package units for attenuating sound in ducts are coming more and more into common use. These units have the advantage of providing, in a

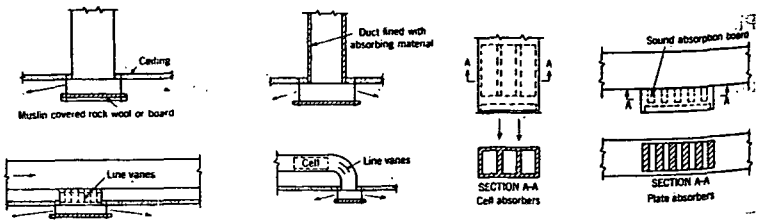


FIG. 12. OUTLET CELLS FOR PAN OUTLETS OR GRILLES

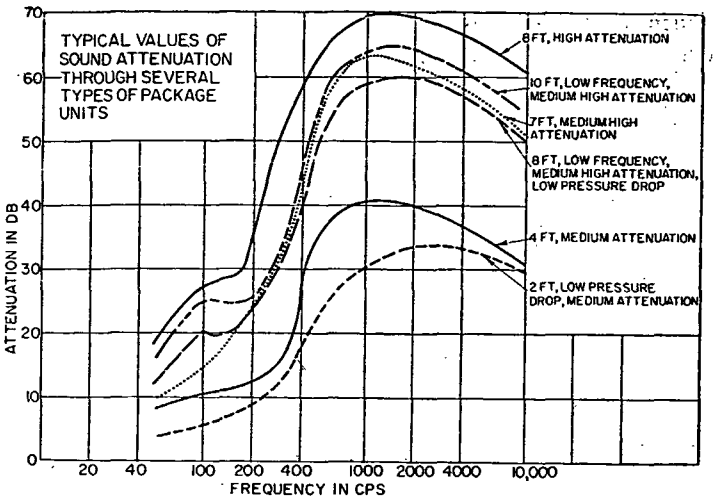


FIG. 13. TYPICAL VALUES OF SOUND ATTENUATION THROUGH SEVERAL TYPES OF PACKAGE UNITS

short length, a known amount of noise reduction with a minimum opportunity for errors in installation and for erosion of materials. The cost of inspection of the completed job is eliminated and the outside dimensions of the duct can be reduced as compared to a lined duct.

These units are available in sizes to fit 6 × 12 in. ducts up to 80 × 84 in. ducts. Charts are supplied by the manufacturers giving the attenuations and pressure drops for different types of units.

In Figs. 13 and 14, the noise reductions and static pressure drops for several types of package units are shown. Manufacturers' literature should be consulted for exact values.

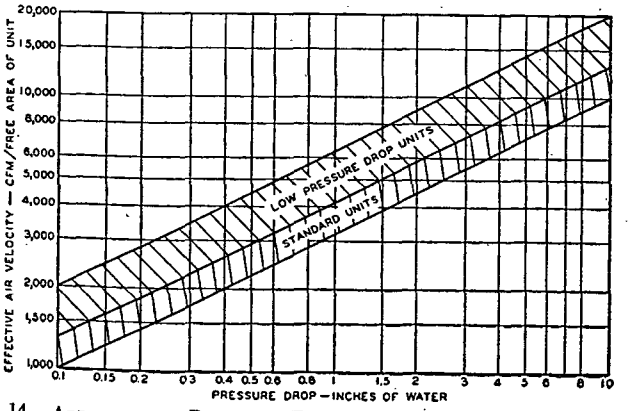


FIG. 14. APPROXIMATE PRESSURE DROP ACROSS TYPICAL PACKAGE UNITS