36.1 A fan supplies air through a $12in$ by $18in$ rectangular sheet metal duct with $1in$ fiberglass insulation. The duct run is $15ft$ long. Local octave band measurements of the sound power level for the fan are $125Hz$, $95dB$; $250Hz$, $94dB$; $500Hz$, $92dB$; $1000Hz$, $90dB$; $2000Hz$, $85dB$; $4000Hz$, $69dB$. What is the expected sound power level for the $1000Hz$ octave band at the end of the duct run?

A. $35dB$

B. $52dB$

C. $69dB$

D. $86dB$

Refer to the table Insertion Loss for Rectangular Sheet Metal Ducts with 1 in. Fiberglass Lining. Look up dimensions $12in$ by $18in$ and note the insertion loss for the $1000Hz$ octave band is $3.7\frac{dB}{ft}$. Multiply the loss per foot times the length of the duct to obtain the total dB reduction.

$$\left(3.7\frac{dB}{ft}\right)(15ft) = 55.5dB$$

Subtract the dB reduction from the measured sound power level for the $1000Hz$ octave band to obtain the final sound power level with the indulated duct inserted.

$$90dB - 55.5dB = 34.5dB$$

Answer A