Calculating Duct Losses

First calculate $A_d$ or $A_{cs}$ as appropriate via Eq 7.11 or 7.12

Then compute Duct Loss/gain via 7.15 or 7.17

Convenient Duct Leakage Classification

\[ C_L \text{ data in table 7-7} \]

\[ C_L = \frac{Q}{A_d} \frac{\text{cfm}}{100 \text{ft}^2} \]

Estimate for different $\Delta P$'s as

\[ Q_{\text{Duct Leak}} = C_L \times \left( \frac{A_d}{100} \right)^{0.65} \left( \frac{\Delta P}{10 \text{ in H}_{2}\text{O}} \right) \]

Page 96 last paragraph in Ducts

Building Infiltration and Moisture

Infiltration - unwanted and undesired airflow into conditioned space.
Any method of estimating infiltration is susceptible to
error.

Infiltration characterized by number
of Airchanges per Hour

\[ \text{ACH} = \frac{Q \text{ (cfm)}}{\text{Area} \times \text{Height} \times \text{426,000}} \]

Table 7.8 and 7.9 give ACH for estab-
lishing leakage for different exfiltrations.

Moisture in buildings

The level of moisture needed to
promote mold growth? 16%

Stick-built home at equilibrium
has about 5%-6% moisture, so
con assume add'l 10% or so—

Vapor Barriers - used to impede
flow of moisture (vapor) into space.
Should be placed on "warm side" of
space to minimize condensation—
Moisture driven by moisture gradient. (food wet to dry).

Permeability - ability of moisture to flow in material - characterized by "perms"

\[
\text{perm} = \frac{\text{grams}}{(\text{in} \ \text{Hg}) \ \text{hr ft}^2}
\]

\[
W = \text{Area} (\text{ft}^2) \times \text{Perm} \times (P_0 - P_i) (\text{in Hg})
\]

\[
= \frac{\text{Area} (\text{ft}^2) \times \text{Perm} \times P_0 - P_i (\text{psi})}{14.26}
\]

Table 7.10 gives perms for different construction materials.

Test 7. 11/10?