

SATURN

RESOURCE MANAGEMENT

2.7 DUCT-INDUCED HOUSE PRESSURES

House pressures drive air through leaks in the building shell and can cause open combustion appliances to backdraft. For energy conservation and safety, you should measure duct-induced house pressures and try to limit them.

An improperly balanced air handling system can reduce comfort, building durability, and indoor air quality. Duct-induced room pressures can increase air leakage through the building shell from 1.5 to 3 times, compared to when the air handler is off.

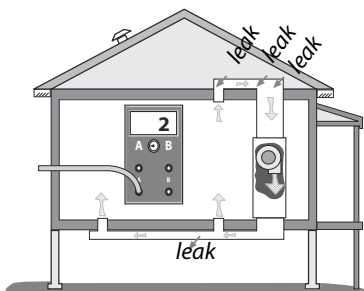
The following test measures pressure differences between the main body of the house and outdoors, between each room and outdoors, and between the combustion zone and outdoors. A pressure difference greater than +4.0 pascals or more negative than -4.0 pascals should be corrected. If the pressure imbalance is the result of occupant behavior such as covering supply or return grilles, discuss these issues with the customer.

2.7.1 Dominant Duct Leakage

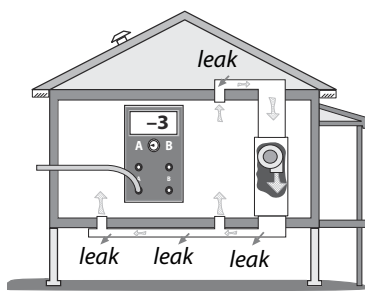
This test helps determine whether duct sealing efforts should be directed to the supply or return duct system. This test doesn't measure the amount of duct leakage.

1. Set up house for winter conditions. Close all windows and exterior doors. Turn off all exhaust fans.
2. Open all interior doors, including door to basement.
3. Turn on the air handler.
4. Measure the house-to-outdoors pressure difference.

A positive pressure indicates that the return ducts (which pull air from leaky intermediate zones) are leakier than the supply ducts. A negative pressure indicates that the supply ducts (which push air into intermediate zones through their leaks) are leakier than return ducts. A pressure at or near zero indicates equal supply and return leakage or else little duct leakage.



Dominant return leaks: When return leaks are larger than supply leaks, the house shows a positive pressure with reference to the outdoors.



Dominant supply leaks: When supply leaks are larger than return leaks, the house shows a negative pressure with reference to the outdoors.

2.7.2 Room Pressure Imbalance

This test identifies room pressure imbalances caused by closed doors in rooms with supply registers but no return registers.

1. Leave the house in winter conditions, and leave the air handler running.
2. Close interior doors.
3. Place hose from input tap on the manometer under one of the closed interior doors. Leave reference tap connected to outdoors.
4. Read and record this pressure measurement for each room. This pressure's magnitude indicates the degree to which the air handler's airflow is unbalanced between supply and return ducts in that room or zone.

If the pressure difference is more than ± 3.0 pascals with the air handler operating, pressure relief is necessary. To estimate the amount of pressure relief, slowly open door until pressure difference drops to between $+3.0$ pascals and -3.0 pascals. Estimate area of open door. This is the area required to provide pressure relief. Pressure relief may include undercutting the door or

installing transfer grilles. For information on reducing duct-induced room pressures, [see page 64](#).

Blocked return path: With interior doors closed, the large positive pressure in the bedroom is caused by the lack of a air return register in the bedroom. The airflow in this forced air system is unbalanced, creating this pressure, and forcing room air through the room's air leaks to outdoors.

