

## **Tamarack Perfect Balance White Paper**

Allison A. Bailes III, PhD

Energy Vanguard

### **The Need**

Heating and air conditioning systems that use air to move heat into or out of a home have a potential weakness. Think about the bedrooms. Many older homes have a vent supplying heated or cooled air to bedrooms, but they often lack a return vent to send the air back to the air handler. Sometimes they have a return vent, but it's not balanced properly.

The result of those situations is a room that develops a pressure difference when the door is closed. Usually, the room builds up a positive pressure because there's no return vent or a return vent that doesn't move enough air.

This positive pressure in the bedroom can lead to conditioned air being lost as it finds ways to escape from the conditioned space. It also means that other parts of the home will be under negative pressure, thus increasing infiltration and perhaps diminishing indoor air quality.

What can you do to fix this? The solution is to think in terms of return air pathways. You don't need a fully ducted return for each room. You just need a way for the air to find its way back to the air handler. That's where the Perfect Balance can help.

### **How the Perfect Balance Works**

The Perfect Balance return air pathway is a grille that gets installed in the bottom of a door. With it in place, the pressure doesn't build up as much when the air handler runs because air in the bedroom travels through the grille and back to the air handler.

For example, in a test of a condo bedroom with no return vent, the pressure in the bedroom was 6.7 Pascals (Pa) higher than in the hallway when the air handler was running. With the Perfect Balance installed, the pressure difference dropped to 1.7 Pa. (A pressure difference of 3 Pa is the threshold required for bedrooms in the ENERGY STAR new homes program.)

Air flow testing of the Perfect Balance in accordance with the Standard Test Code by the Energy Systems Laboratory of the Texas A&M Engineering Experiment Station showed that the air flow rate is about 86 cubic feet per minute (cfm) at a pressure difference of 3 Pa. That air flow rate will handle all or most of the supply air in many bedrooms.

### **Summary**

The Perfect Balance is an inexpensive way to provide a return air pathway. It's easy to install and can bring the pressure difference down below the 3 Pa threshold for many bedrooms. It also contains a cardboard baffle to dampen sound transmission, which provides more privacy.

In addition, the Perfect Balance can eliminate return ductwork, which can cut installation costs in new duct systems. By reducing return ductwork in unconditioned spaces, these transfer grilles also can reduce the heating and cooling loads.

In summary, the Perfect Balance is an excellent retrofit product for rooms that need a return air pathway.