



WARMING UP “COOL” ROOMS

What is a “cool” room?

A “cool” room is a room or area of a house that feels cooler than the surrounding rooms or areas. Sometimes this is one room, such as a bonus room over a garage. It can be a basement or perhaps it is just one area within the room which is noticeably cooler.

A cool room occurs when there is more heat lost from the room than is being supplied to it. There are two sides to the issue; heat loss and heat supply.

Our Perception of Temperature

Humans can detect a temperature difference as little as half of a degree. Our perception of being warm or being cool is also affected by age, level of activity, air movement and health. The perception of warm and cool is also affected by the humidity level. A hot humid room seems warmer than a hot dry room. A damp, cool room feels cooler than a dry cool room. A still environment feels warmer than one with air movement. Flooring products also make a difference (i.e. a tiled floor feels cooler than a carpeted floor).

Expectations Are Changing

Comfortable housing has come a long way. Picture an old farm house in the depth of winter - huge registers, uninsulated walls and windows with single panes of glass. In these homes the furnace would turn on and blast a tremendous amount of high heat into the room and then shut off. Within a very short period of time the house would lose its heat and the walls seemed to radiate cold. Today our houses are capable of maintaining much more uniform temperatures. Houses

are built to withstand conditions over the majority of the year, however slight variations from one room to another in a house still will occur. It is possible to reduce the effect of extreme cold or warm periods of the year and to achieve better uniformity from room to room, but there are additional costs to achieving this that must be discussed with the builder before construction begins. Potential changes should be part of the specifications agreed upon with your builder.

Matching Expectations with Construction Reality

The concept behind maintaining a constant temperature is simple; supply enough heat to compensate for the heat lost. This is easier said than done when each area of a house loses heat at a different rate and often only one heating unit and control is used to supply heat.

The Influence of the Outdoor Environment

All exterior climate conditions influence heat loss in a house.

Wind can effect heat loss in a house. The exposure of a room to the wind varies from one part of a house to the next. Some rooms are sheltered by neighbouring buildings, decks or trees while others are exposed to the sometimes prevailing winds. Air moves through the wall in an exposed location causing exposed walls to cool more quickly than sheltered walls. This effect can be more pronounced if the room is on a second storey, over a walk-out basement, facing a lake or an open field.

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At The Alberta New Home Warranty Program, we believe the answer is “Your Home Smart Advantage”.

We understand that owning a new home can seem overwhelming at first. But like all things in life, a little education goes a long way. Your Home Smart Advantage is about helping you become a better, more knowledgeable homeowner. With that knowledge, you can be more comfortable with your surroundings and the systems your builder has in place.

Your Home Smart Advantage means you have regular access to “Consumer Bulletins” on topics of concern in your new home experience.

“Consumer Bulletins” provided by The Alberta New Home Warranty Program maintain and enhance your knowledge base on technical issues and engages the building industry on topics of concern to homebuyers like you.

The Alberta New Home Warranty Program is dedicated to being a leader in providing warranty services to the home building industry. We are also deeply committed to making the building process more satisfying for both builders and buyers through knowledge and information. We are... Your Home Smart Advantage.

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The exposure of the walls to the outside weather is not the same for each room. Some rooms have their temperatures buffered by other rooms. Some have three walls and the floor exposed while others have flat ceilings. Those with high vaults will also be more exposed to the outdoor weather.

Barriers to the Outdoor Environment

In our homes the walls, floors, ceilings, windows and doors are all used as barriers to separate the outdoor environment from the indoor environment. These barriers do not stop the transfer of heat, they only slow it down. Controlling heat loss and gain is balanced with creating a strong envelope that buffers climatic effects while allowing natural light in.

Some materials used in constructing walls transfer heat more quickly than others. For example, wood members used for framing conduct more heat through the wall than the cavities between the wood studs that are filled with insulation. Additional wood is needed in some areas of walls to support windows or to tie wall corners together. These variations in materials result in slightly uneven temperatures from one wall to the next and across the surface of the wall. Missing insulation can contribute to a cool area however this is seldom the major cause of a cool room. The heating system usually compensates for above wall variations, but windows pose more of a problem.

Windows do not resist heat flow nearly as well as walls do. Windows can be said to be "thermal holes". The insulation value of windows is roughly 10 % of the adjoining walls. When sun shines on windows,

heat moves through the window into the house. If there is no sun shining

on the window heat flows from the house to the outdoors. Some rooms have very few windows while some rooms have large banks of windows, which can result in cold areas in a room.

Typical Construction Practice

Sometimes construction methods can be upgraded to minimize wall temperature differences, but these must be discussed with your builder before construction. Although missing insulation can contribute to a cool area, this is seldom the major cause of a cool room.

Required Heating Design Parameters

Heating contractors must calculate the overall heat loss of a home in order to recommend the size of furnace that it is capable of maintaining an indoor air temperature of 22°C in all living spaces and 18°C in unfinished basements at the outside winter design temperature. The winter design temperature varies slightly from one location in the province to the other, but is based on the very cold days of the year. In order to deliver even heat to all of the areas of the house, the system must be designed and balanced to provide sufficient flow to all rooms especially those with higher heat loss.

The Heat Delivery System

Supplying even heat in a home can be a challenge when one furnace is used. Some rooms are closer to the furnace and some are further away. As heated air moves along the ductwork, some heat is lost as it transfers through the duct and some is lost as air leaks out of unsealed joints in the ductwork. The ducting may detour

around an obstruction such as a stairway to a bonus room or a beam supporting floor joists. The increase number of bends in the ducting results in more heat loss and reduced air flow.

To create even heat, the air used to transport the heat must circulate. If it does not, the effect is similar to blowing into a straw when one end is blocked. Debris, toys or a dirty furnace filter can also reduce air movement and restrict the heat supply. The path of air flow between heat supply duct and the cold-air return duct should also be open.

Some features make it difficult to strategically position heat ducts to counter-act cold spots. A jetted tub under a window is a common example of this. The heat ducts cannot always be placed directly at the window to counteract the movement of air as it cools and flows down the window towards the tub.

Controls

Usually there is one thermostat controlling heat to the whole house. The thermostat may be located in a room with less heat loss than the "cool" room or in a hallway where nobody spends any significant time. There may be other sources of heat that affect how the thermostat work such as a window or a fireplace. In these situations, the heating system supplies heat to satisfy the room where the thermostat is located, which may not be enough for the "cool" room. The heat flow to each room can be increased or decreased by adjusting air flow rates to individual rooms at the room outlets. In some cases the flow of heat needs to be increased or an additional heat source added.





Improving Heat to a "Cool" Room

Before a heating contractor is called in to check the performance of the heating system there are steps that you as a Homeowner can take to correct a cool room situation (see chart on the right).

If These Simple Solutions Don't Work...

More elaborate measures may be needed.

A heating contractor can confirm the sizing of the furnace in relation to the heat loss of the house.

They can calculate the amount of heat that the delivery system is capable of sending to the cool area and calculate whether the delivery capacity is sufficient for the calculated heat loss. Additionally a test for major areas of air leakage and a visual check for obvious missing insulation can be conducted. There is no real way to 100% assess the effects of air leakage or uneven heat loss of the walls, but a professional will be able to assess how significant it may be.

If there is insufficient heat being supplied to the room there are ways of improving this. The first step is to enhance what is existing. An enhancement could be adding additional in-line fans to increase air flow from the furnace. It could be increasing insulation levels or reducing air leakage.

In some cases a separate heat source for the cool room may be required.

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Issues & Potential Solutions

Low air or no air flow at the room outlets

- Adjust heat flow (floor registers) to decrease the airflow to the warm room and direct more air to the cold room;
- Ensure heat ducts are free of debris;
- Clean or replace the furnace filter.

Thermostat located in an area other than the cool room

- Adjust heat flow (floor registers) to decrease the air flow to the warm room and to direct more air to the cold room;
- Reduce the low temperature set time of a programmable thermostat;
- Run the furnace fan continually to circulate more air into and out of the cool area;
- Reduce the effect of a heat source in the room with the thermostat;
- Add a supplemental heat source with its own thermostat to the cool room;
- Run the furnace fan continuously on low speed.

Return air duct located outside a cool room where the door is typically closed.

- Ensure the cold air return is not blocked;
- Undercut the door or leave the door to the room open to allow air circulation from the supply outlet and for heat to enter the room.

Cold floors over unheated areas

- Use a less dense floor covering product (i.e. carpet);
- Allow heat flow from the heat ducts to move between the floor joists under the floor;
- Add extra insulation in the underside of the exposed floor;
- Reduce air leakage from the outside into the exposed floor.

Cold areas under or beside large glass areas

- Ensure air from the heat source is not deflected away from the glass;
- Ensure the ducting is clear of debris and the furnace filter is clean;
- Increase heat flow to the window area by opening the register under the window and closing registers in other areas;
- Use a ceiling fan to mix the warm air in the room with cooler air zones near the windows;
- Check the condition and seal of the window;
- Install or close existing curtains when the area is occupied, to add an extra insulation blanket to the windows.

NOTE: this can increase condensation on the window.