BUILDING A BETTER HOME

At SOLACE, a *'Better Built Home'* is one that is comfortable, healthy, and energy efficient. It is a home that incorporates three main principles:

- **Higher insulation levels**
- **Well-sealed (airtight) envelope**
- **Adequate ventilation (with heat recovery)**

These principles are fundamental in today's well-built homes.

When you incorporate these principles into your home, you will enjoy a comfortable, draft-free environment; you will decrease respiratory risks by breathing clean fresh air; and you will save money through reduced operating costs.

The simplest way to make sure your new home will have all of these advantages is to ask your builder to build to the following standards. By following the eight steps in this guide you will better understand why a *SOLACE 'Better Built Home'* is a superior home that will become standard for the future.

Step 1: Envelope
Step 2: Heating System
Step 3: Controls
Step 4: Ventilation Systems
Step 5: Water Heating
Step 6: Appliances
Step 7: Lighting
Step 8: Fireplaces, Stoves and Chimneys

Step 1: Envelope

The envelope of your house is everything that separates you from the outside climate, that is, walls, ceilings, windows and doors. The envelope regulates the heat loss from the house and the solar (heat) gains through the windows and skylights. It also determines the amount of air leakage. A well-insulated, draft-free envelope keeps the heat inside during the winter and keeps the heat out during the summer.

Because the envelope can be the biggest energy loser in your house, it offers you the greatest potential for saving energy.

Windows are particularly important in a *SOLACE 'Better Built Home'*. In a well- insulated, draft-proof house more energy is lost through windows than through any other part of the house, even though they represent a small proportion of the total envelope.

Window frames, on the other hand, contribute minimally to building heat losses. They should, however, have a thermal resistance ® value at least equal to the glazing they support. It is recommended for your *SOLACE 'Better Built Home'* that window frames be made of wood, vinyl or thermally broken metal.

Perhaps the least understood component in the envelope is the vapor barrier where up to 50% of the heat can be lost. Firstly, this air barrier stops warm, indoor moisture-laden air from traveling through the exterior walls and condensing along the way to the cold exterior, causing what is often referred to as "dry rot". Secondly, in winter, by stopping the heated warm air from traveling to the outside, this air barrier is contributing to significant reduction in energy costs. The *SOLACE 'Better Built Home'* is to have a continuous air barrier, and to be capable of meeting a fan door test requirement of 1.5 air changes at 50 Pascal negative pressure**.**

Step 2: Heating System

Selecting options available to heat a home is not always straightforward. Often compromises are made both in terms of the HVAC system and its application, the requirements of the homeowner, and the finances. While tiles, paint colors, furnishings, flooring, etc. can be easily changed, the mechanical system cannot always be altered at a later date. Careful attention at the planning stage will save money and unnecessary changes later.

In your *SOLACE 'Better Built Home'*, your new heating system should deliver maximum comfort with long-term savings. It must provide the heating requirements of the home under "design day" conditions, and should have a little extra capacity to provide for pick-up after a period of low temperature. The capacity of the heating system should be determined by a *room-by-room* heat gain / loss calculation, not by rule of thumb.

With that said, your HVAC system can include so much more. SOLACE has always recommended a **Complete Air Management System.** This system is comprised of **forced air integrated with ventilation and is the best way to satisfy all aspects of the home's comfort and air management.** Heating, cooling, ventilation, zoning, fresh air, humidification, and filtration through a properly designed and installed forced air ducted system, is significantly superior in its precise controllability and quick recovery than any other option.

Step 3: Controls

The thermostat has undergone a remarkable transformation from a

simple comfort control device to an easy-to-read, backlit LCD display, energy management tool. Now, at very reasonable cost, you can have a thermostat that will provide both night and day settings with different schedules for weekdays and weekends. A thermostat that accurately operates each zone for heating or cooling (with automatic changeover switches) in response to comfort requirements will provide operating efficiency and economy as well as comfort.

Outside temperature displays can be connected to thermostats so that occupants can check outside temperature prior to leaving the house.

Clean filter indicators now remind you when to service, change or clean the filter.

Humidistats are used to signal the humidifiers to add moisture when the air is too dry, and timers are used to zone for quick exhaust when humidity is too high.

Step 4: Ventilation Systems

The B.C. Building Code requires some form of mechanical ventilation in all new housing, but to a great extent how this is accomplished is left up to the builder. Your *SOLACE 'Better Built Home'* will have a Heat Recovery Ventilation System that incorporates a distribution system to ensure that each room has either a **continuous** fresh air supply or an exhaust connection. In cold weather the heat recovery ventilator will recover a high percentage of the heat from the exhaust air and preheat the incoming fresh air. This provides the best ventilation available today, and assures continuous fresh air throughout the house with the economy of heat recovery from exhaust air.

Step 5: Water Heating

The amount of energy used for heating domestic hot water depends on your family size and lifestyle, with slight variations due to fluctuating seasonal inlet water temperatures.

A storage water heater has two purposes: to transfer heat from the fuel to the water and to retain the heat in the water until the hot water is needed. The heat that escapes from the tank through the insulating jacket is referred to as the "standby loss."

To reduce standby losses, water heater manufacturers produce tanks with better insulation. Since these tanks usually cost only slightly more than a standard tank--as little as $35 more--they are well worth the added cost.

A standard showerhead uses about 95 liters (21 gallons) of 38 C (100 F) water for a seven-minute shower. A low-flow or conserving

showerhead uses about 65 liters (14 gallons) for the same shower; on average, low-flow showerheads use one-third less hot water than a standard head.

Single-lever shower valves are also recommended as less hot water is wasted in selecting the desired shower temperature.

Low-flow faucets are a good choice for sinks and basins used mostly for hand washing (but not for applications where large volumes of water are required).

Step 6: Appliances

When shopping for appliances, compare Energuide labels. If you find more than one appliance with the quality and features you want, the one with the lowest energy use rating on the Energuide label will be the wisest choice.

Most major appliances will last at least ten years, so when you purchase an appliance you are committing yourself to ten years of energy consumption. A difference of 25 kW.h per month in energy consumption at 5 cents per kW.h amounts to $150 of electricity in ten years. Since appliances with lower Energuide ratings don't necessarily cost any more than others, they could certainly be the "best buy" in the long run.

Step 7: Lighting

Although light sources (bulbs, tubes) are sold on the basis of wattage, the watt is a unit of power or heat, not light. The unit of light is the lumen, and the bulb or lamp converts the watts into lumens, although not always with the same efficiency. A standard two-tube fluorescent fixture provides about four times as much light per watt as a standard incandescent bulb.

Until recently, fixtures for incandescent and fluorescent lamps were incompatible, but now there are compact fluorescent lamps that fit incandescent lamp fixtures and give a similar warm light. These new lamps provide three to four times as much light per watt as incandescent lamps and last nine to ten times longer. As a result, using fluorescent lighting in as many areas as possible gives you long-term economy and convenience.

Step 8: Fireplaces, Stoves and Chimneys

Wood burning fireplaces and stoves can take a lot of heated air from the house and expel it up the chimney with the smoke. There are several ways to reduce this waste:

- Don't install naturally aspirating fireplaces. Instead, use an airtight stove with a source of combustion air from outside drawn directly into the firebox.
- Install tight-fitting doors on all fireplaces and provide combustion air as above, or use an airtight fireplace insert. These measures also significantly reduce firebox odors.
- Brick and stone masonry fireplaces should be built on inside rather than outside walls:

    - to avoid potential chimney fires (cold chimneys can build up creosote very fast)
    - will be easier to light
    - to avoid odor and back drafts
    - to prevent conducted heat loss of $50 to $150 per year (R-value of brick is R-0)

- All fireplaces should have a tight-fitting damper in the flue. Without it, the fireplace will expel heated air continuously, or be a source of drafts.
- All gas fireplaces should be direct vent. Many architects, homeowners, and contractors are not aware that as well as venting straight through the wall, you may direct vent through the roof up to 40 feet.

A Summary of *SOLACE 'Better Built Homes'* benefits can be put into 5 categories:

1. **Structure** - sound structure, moisture-laden air cannot migrate into exterior walls.
2. **Energy savings** - much lower heating costs, and higher resale value.
3. **Lifestyle** - draft-free and warmer interior surfaces for added comfort; very quiet due to thicker walls, better windows and tighter construction.
4. **Health** - healthy environment due to fresher, filtered, humidity controlled air.
5. **Environmentally friendly** - hi-efficiency appliances burn less fossil fuel, and Puron refrigerants are earth friendly.

Building Component	Technical Requirement	Reason
Gas or propane furnaces	To be sealed combustion (direct vent)	If you want an airtight house, you must have an airtight heater
Heating system duct work	All heating system duct work	To reduce heat losses

	located outside the insulated envelope to be duct sealed and insulated to a minimum of R7 (foam preferred)	through duct work, duct seal and foam to reduce air leakage
Gas or propane boilers	To be sealed combustion (direct vent)	To set high levels of efficiency and achieve an airtight house
Gas or propane fired domestic hot water tank	To be sealed combustion (direct vent)	To set high levels of efficiency and achieve an airtight house
Wood stoves and fireplaces	Outside combustion air supply directly to the firebox and tight-fitting doors. Straight up chimneys (no offsets) contained inside the heated envelope	To resist smoke spillage, creosote build up, and increase efficiency. Firebox odors from cold fireplace chimney and stoves will also be substantially reduced
Gas fireplaces	To be sealed combustion (direct vent)	To resist flue gas spillage and increase efficiency and achieve an airtight house
Combustion air ducts	To be insulated to a minimum of R2 and wrapped with an exterior vapor barrier when passing through heated spaces	To control condensation and reduce heat losses
Un-vented combustion appliances (such as gas ranges)	Not to be installed unless provision made to vent products of combustion directly to the outside (such as the range hood)	To control condensation and buildup of indoor air pollution
Electric domestic hot water tanks	To be energy efficient models CSA C191, or Power Smart labeled	To reduce energy consumption
Insulation levels and window types	To be determined according to the location of the house and based on the room by room Heat/Cool load calculations	To allow builders /owners to understand, make changes and comply with the our requirements more easily