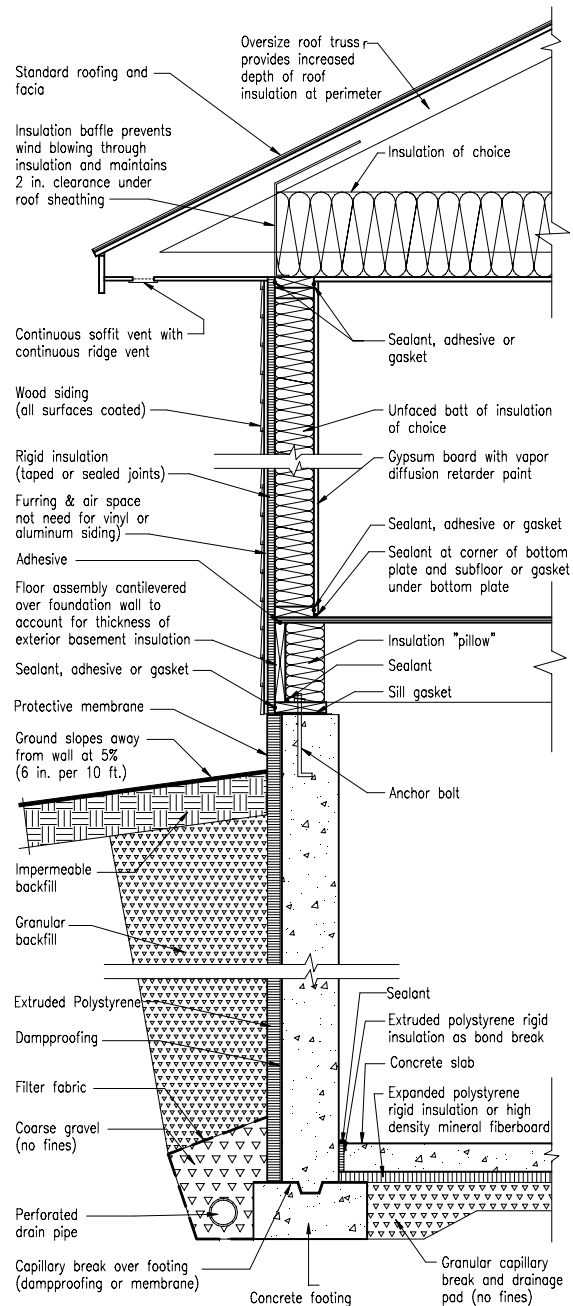


COMFORT PLUS HOMES WALL SECTION



ACHIEVING THE AIR TIGHT HOUSE

The secret of a comfortable, efficient, quality *Comfort Plus Home™* is building it air tight, with controlled ventilation.. You might ask, why build it tight if you are going to have to put in a special controlled ventilation system? Why not just allow the building to ventilate itself? The big reason is MOISTURE. If you allow moisture to get into the walls and the attic (where it is cold in the winter), you will get condensation, which leads to mold and mildew and eventual rotting of the structure.

The solution: pay special attention to making the home as tight as possible and install a controlled ventilation system. This will allow the home owner to exhaust old and stale indoor air as well as control of the amount of fresh air coming into the home. Commercial buildings have been doing this for years.

Here's a list of locations where you need to make sure the holes and cracks are sealed:

- basement floor/wall joint
- sill plate
- rim joist (top & bottom)
- wall/floor joint
- around doors & windows
- electric outlets & switches
- wire penetrations into attic
- light fixtures
- utility service entrances
- around plumbing stacks & chimneys
- attic hatch
- around vents

SUMMARY

In conclusion, build the home smart (tight and well insulated, paying attention to detail) and it will be comfortable, efficient, and durable. A well-built, high quality home that will last far into the next century.



Comfort Plus Homes™

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BUILDER'S CONSTRUCTION GUIDE



Comfort Plus Homes™

*An Iowa Association of
Municipal Utilities Program*

DESIGNING FOR COMFORT, QUALITY, AND EFFICIENCY

A **Comfort Plus Home™** is a home designed for comfort, quality, and efficiency. What does it take to build a **Comfort Plus Home™**? Most builders today feel that if they use quality materials and good workmanship, a quality home will result. If that is the case, why do we have so many callback problems today? We have better paint, better insulation, better windows, than ever before, but we have more problems today than ever before. Why is that?

The problem is not good workmanship or materials, the problem is understanding. Houses built 30-50 years ago were cold and drafty, while houses today are considered quite comfortable, but frequently experience durability problems. We have sacrificed durability for comfort.

There are three important changes in the last fifty years: the introduction of thermal insulation, the development of tighter building envelopes, and the invention of forced air heating and cooling systems. Each of these changes have made our homes more comfortable, but also less durable. Fortunately, it doesn't have to be this way. We can build homes that are comfortable, durable and energy efficient.

The **Comfort Plus Home™** program wants to change all that. You can have a comfortable home that is also efficient and durable. By understanding how the components of a house interact and using the proper construction techniques, you can build a house that is comfortable, efficient, and will last 100 years. Follow these simple construction guidelines and you'll have a house that you can be proud of.

KEYS TO A COMFORT PLUS HOME

The following are some of the key design elements for a Comfort Plus Home:

- **Site Selection** (not always an option, but if the option is there, consider these elements):
 - Select a site with the back to the S, SE or SW.
 - Shelter site from the NW winds and open to the S/SW summer breezes.
 - Make sure site is well drained.
- **House Layout**
 - Locate the most actively used areas (family room and kitchen) where they will benefit from daylighting.
 - Concentrate windows on the south side to capture solar gains in the winter.
 - Minimize east and west windows to lower cooling costs.
 - Use light colored walls, floors, and ceilings to maximize the daylighting effect.

- Locate the garage on the NW corner of the house to buffer against the winter winds.
- Locate fireplaces on interior walls, not exterior.
- **Building Envelope**
 - Seal all joints in the building envelope with caulk or a gasket.
 - Seal all penetrations into the building envelope.
 - Install a vapor diffusion retarder on all inside walls and ceilings.
- **HVAC Systems**
 - Install a controlled ventilation system. Building envelopes must be "built tight, and ventilated right".
 - Use a power vented or sealed combustion unit if you are using natural gas or propane as your heating and/or water heating fuel source.
 - Locate furnaces and/or air handlers within conditioned space.
 - Use fully ducted returns, not panned floor joists or other building cavities.
- **Appliances**
 - Install a kitchen range hood directly ducted to the outside, if a gas range is going to be used.
 - Use outside air for combustion for fireplaces and/or wood stoves.
 - Consider energy efficiency when selecting refrigerators, freezers, washers, dryers, and light fixtures.
 - Directly vent dryers to the exterior.
- **Commissioning** (ensuring proper functioning of the home and educating the occupants)
 - Test the building envelope for air leakage with a blower door.
 - Test the ducts for leakage.
 - Test the venting of carbon monoxide from combustion appliances under all operating conditions.
 - Test the home for radon gas.
 - Educate occupants in the correct operation, maintenance, and housekeeping requirements of the home.

These are the keys to a **Comfort Plus Home™**. It is highly recommended that you obtain a copy of the Energy Efficient Building Association's (EEBA) *Builder's Guide* for an in-depth look at how to build comfortable, efficient, quality homes that will stand the test of time. You can obtain a copy of the EEBA *Builder's Guide* from the Iowa Energy Center, 2521 Elwood Drive, Suite 124, Ames, Iowa 50010, 515-294-9331.

RECOMMENDED ENERGY EFFICIENCY FEATURES

Below is a table that gives you the recommended energy features to achieve the **Comfort Plus Home™** designation. The table also includes features that will help you achieve even higher

levels of efficiency. These are just recommended starting levels. Your house may not achieve these ratings due to orientation or home configuration. You need to submit your plans with your specific energy features to Energy Rated Homes of Iowa for a preliminary energy rating. The final rating also depends on an actual test of the air tightness of the home. If you have the recommended insulation levels and equipment efficiencies, but have not paid attention to air sealing, you may not achieve the desired level of efficiency.

Building Section	Comfort Plus Home PPPP+	Comfort Plus Home PPPPP	Comfort Plus Home PPPPP+
Foundation*	R-10	R-13	R-19
Rim Joist*	R-20	R-20	R-20
Side Walls*	R-15	R-22	R-25
Windows	R-3	R-3.5	R-4.7
Doors*	R-5	R-5	R-5
Ceiling*	R-40	R-40	R-50
Furnace <small>properly sized & sealed combustion or power vented</small>	90% AFUE	90% AFUE	95% AFUE
Air Conditioner <small>properly sized</small>	12.0 SEER	12.0 SEER	14.0 SEER
Controlled Ventilation System	Yes	Yes	Yes
Duct Work <small>Joints sealed with mastic & insulated in unconditioned</small>	Yes	Yes	Yes
Water Heater	.59 EF	.59EF	.96EF
Natural Air Leakage Rate	.35 NACH	.15 NACH	.05 NACH
HERS Rating Point Score	PPPP+ 86.0	PPPPP 90.0	PPPPP+ 95.0

* Insulation levels listed are the composite r-value of the entire assembly.

This is only a starting place. You can achieve the **Comfort Plus Home™** level of efficiency in any number of ways. We encourage you to experiment with different approaches to determine which construction approach works best for you.

The following page shows one way to build to the **Comfort Plus Home™** level of efficiency. This wall section is meant only to serve as a guide if you are not sure where to start. You are free to come up with whatever approach works best for you to achieve the **Comfort Plus Home™** designation.