

Infrared Thermometer Home Energy Assessment Questionnaire

Please use this questionnaire along with an infrared thermometer to identify areas that might need attention.

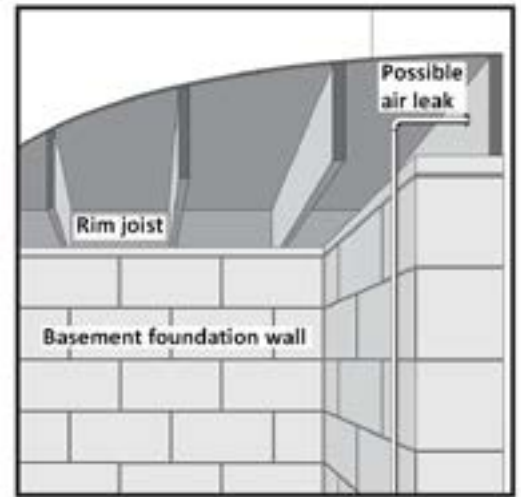
A detailed procedure for determining insulation levels and R-values is described in NDSU Extension publication AE1373, "Determining Insulation and Air Infiltration Levels Using an Infrared Thermometer."

The bigger the difference between inside and outside air temperatures, the better the following measurements will work.

For information on insulation types and recommended insulation levels consult NDSU Extension publication AE1368, "Insulating to Reduce Heating Costs."

BASEMENT

- Are basement walls or foundations insulated?
 Yes No Not sure
- If yes, are they insulated on the inside ____ or outside ____
 - Amount of insulation _____ inches
 - Type of insulation (fiberglass, rigid foam, etc.) _____
- Are the rim joists, where the basement foundation meets the house framing, insulated? *(See image at right.)*
 Yes No Not sure
- Are there areas where plumbing, electrical or other penetrations are not sealed and insulated? This would be indicated by a difference in temperature or visible air space. Yes No
- Are the basement windows single pane? Yes No
- Can you detect any air leaking around the window frames? Yes No
- What areas did you find that needed attention? _____



- What actions did you **take** to remedy any problem areas? _____

- What actions do you **plan** to remedy any problem areas? _____

LIVING SPACE

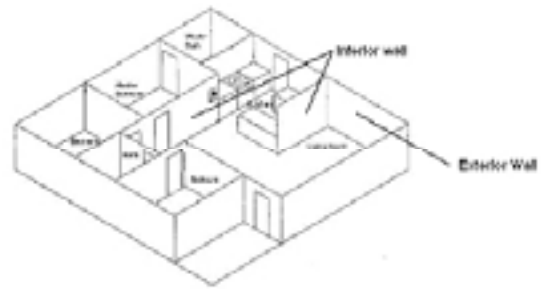
Living Room

Use the procedure outlined in NDSU Extension publication AE1373, "Determining Insulation and Air Infiltration Levels Using an Infrared Thermometer," to estimate wall insulation levels, R-values and possible air leaks in the living room, then use the same basic procedure in each room in the house.

Interior wall temperature _____ Exterior wall temperature _____ Estimated R-value _____

Temperature difference between interior surface of an exterior wall and an interior wall surface for various outside temperatures and insulation values. Insulation R-values are estimates due to inaccuracies in the measuring device.

	Estimated R-value							
	5	10	15	20	25	30	35	40
	Temperature Difference °F							
40	4.1	2.0	1.4	1.0	0.8	0.7	0.6	0.5
30	5.4	2.7	1.8	1.4	1.1	0.9	0.8	0.7
20	6.8	3.4	2.3	1.7	1.4	1.1	1.0	0.8
10	8.2	4.1	2.7	2.0	1.6	1.4	1.2	1.0
0	9.5	4.8	3.2	2.4	1.9	1.6	1.4	1.2
-10	10.9	5.4	3.6	2.7	2.2	1.8	1.6	1.4
-20	12.2	6.1	4.1	3.1	2.4	2.0	1.7	1.5
-30	13.6	6.8	4.5	3.4	2.7	2.3	1.9	1.7
-40	15.0	7.5	5.0	3.7	3.0	2.5	2.1	1.9



For example, if you measure the temperature of an exterior wall and the difference in temperature between that wall and an interior wall is 4 °F and the outside air temperature is minus 20 °F, the estimate of the level of insulation in that wall is R-15.

- Do you have small areas of exterior walls with differences in temperatures that could indicate no or failing insulation? Yes No
- Check for insulation levels in the ceilings that have unheated space above them, such as an attic or exterior roof. Use the same procedure for determining R-values in walls. What is the estimated insulation level in the ceiling?
- Ceiling R-value _____
- Do you have temperature differences (indicating air leaking) around the windows? Yes No
- Do you have air leaking around outlet covers and light switches indicated by a temperature difference?
 Yes No
- Insulation levels often are lower and air often leaks around light fixtures, especially recessed lights. Do you have any temperature difference around light fixtures (that are off for several minutes before testing), indicating lack of insulation or leaking air? Yes No
- Do you have a temperature difference around exterior doors indicating air leakage? Yes No

Now repeat the same procedure in each room in the house →

Family Room

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Kitchen

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Dining Room

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Office

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Master Bedroom

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Bedroom

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Bedroom

- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

Other _____

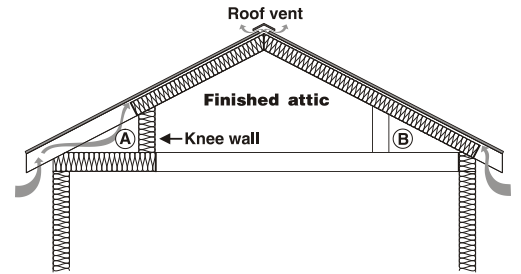
- Estimated wall R-value _____
- Ceiling R-value _____
- Window air leaks Yes No
- Outlet air leaks Yes No
- Missing insulation Yes No
- Light fixture air leaks Yes No
- Exterior door leaks Yes No

ATTIC

- What type of insulation is in the attic?
 - Fiberglass batts Loose cellulose or fiberglass Expanding foam Other _____
 - None Not sure
- Roughly how many inches of insulation do you have in the attic? _____
- Is the attic access (ladder, door or hatch) in a heated portion of the home?
 - Yes No
- If yes, is the access insulated? Yes No
- Is air leaking around the attic access? Yes No
- Do you have a partially finished attic space? Yes No
 - If yes, are the knee walls insulated? Yes No
- Is air leaking around any heating, plumbing or electrical penetrations? Yes No
- What areas did you find that were in need of attention? _____

- What actions did you take to remedy any problem areas? _____

- What actions do you plan to remedy any problem areas? _____



ADDITIONAL HOME ENERGY-RELATED ITEMS

- What is the age of the home's heating source (furnace)? _____
In 1992, the U.S. government established a minimum efficiency rating of 78 percent for furnaces.
If your furnace was manufactured prior to 1992, it could be very inefficient.
- Are you using a programmable thermostat on your furnace? Yes No
- Do you have a low-flow shower head installed in your shower? Yes No
Water heating accounts for about 10 percent of household energy consumption.
Installing low-flow shower heads reduces this energy use.

For more information on this and other topics, see www.ag.ndsu.edu

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