



*Energy Efficiency Consulting Services and Solutions*

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Blower door diagnostic test operates the building at a negative pressure creating infiltration of cooler outdoor air through penetrations in the thermal envelope.

The infrared camera measures interior surface temperature. The surface temperature cools off as the cold outdoor air infiltrates into the home through penetrations.

Blue colors highlight cooler surface temperatures caused by this infiltration of outdoor air.

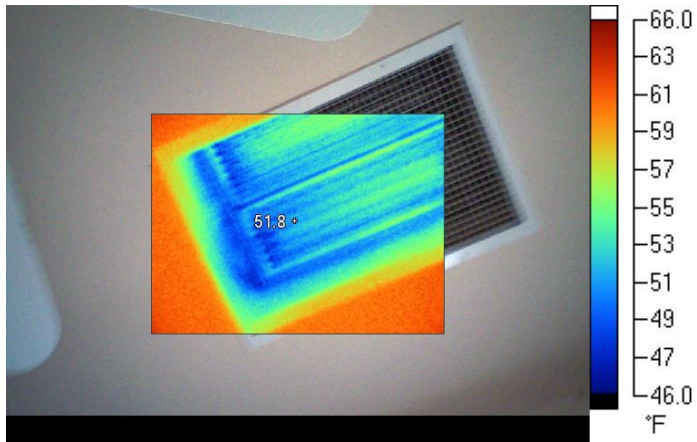
## **Infrared Energy Audit**

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*Prepared For:*

**Doe, Jane**  
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Northfield, MN 55057  
(507) 555-5555  
[Doe.Jane@gmail.com](mailto:Doe.Jane@gmail.com)

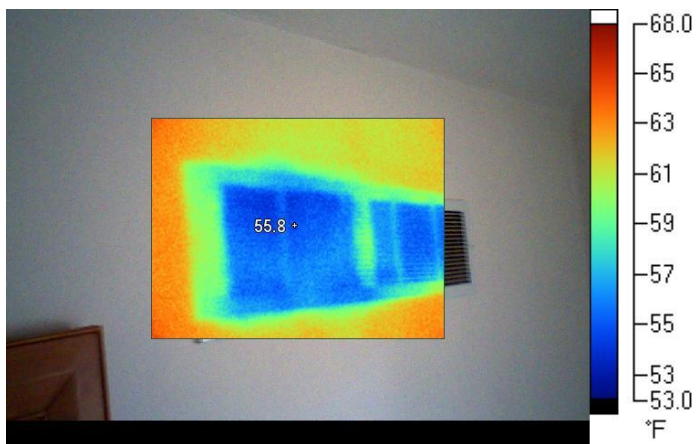




### 1. Ceiling Exhaust Fan

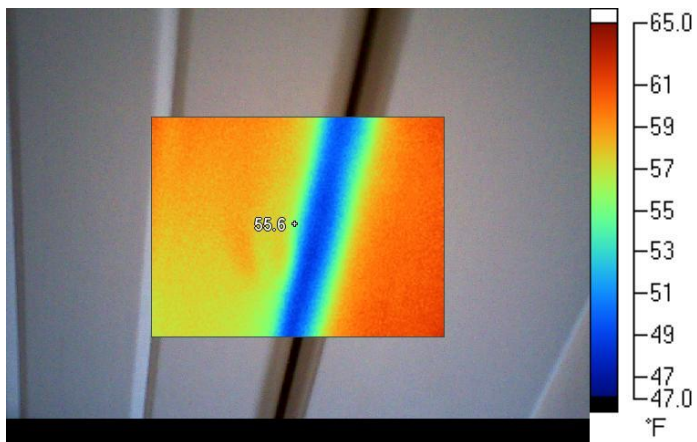
Not airtight.

Install plastic window kit in the winter to stop the hot air from leaving.



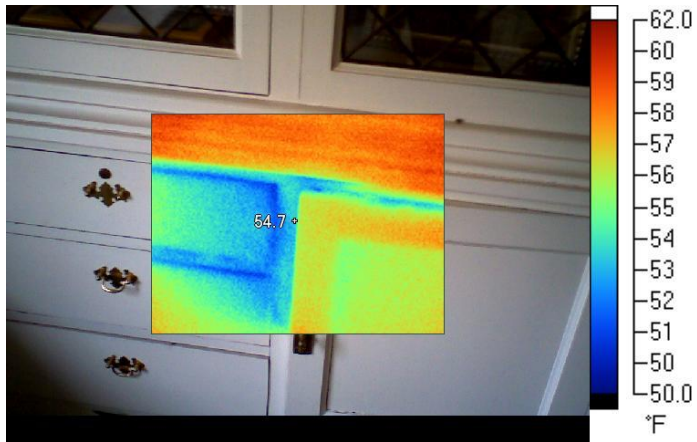
### 2. Cold Air Return for A/C

Remove grill and seal wall cavity. Roll up faced fiberglass inside a plastic bag and shove into the 2x4 cavity above the register.



### 4. Doors to Kneewalls

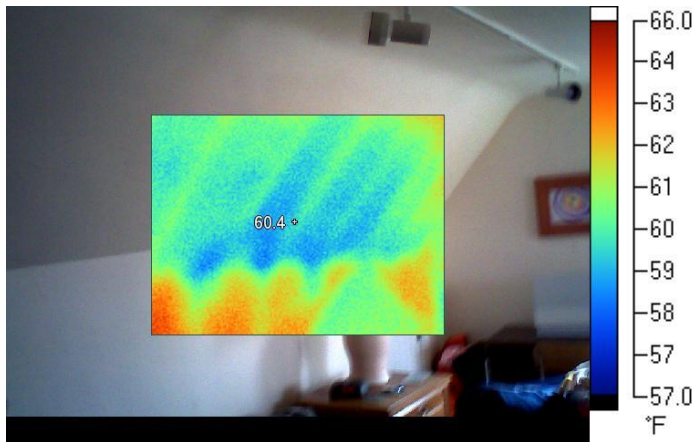
Weatherstrip all 4 edges airtight.



### 5. Built In Cabinet in Kneewall

Construct an insulated/airtight wall cavity around the cabinet inside the side attic.

- Stick-built framing with rigid insulation and spray foam to seal all gaps, joints and penetrations.



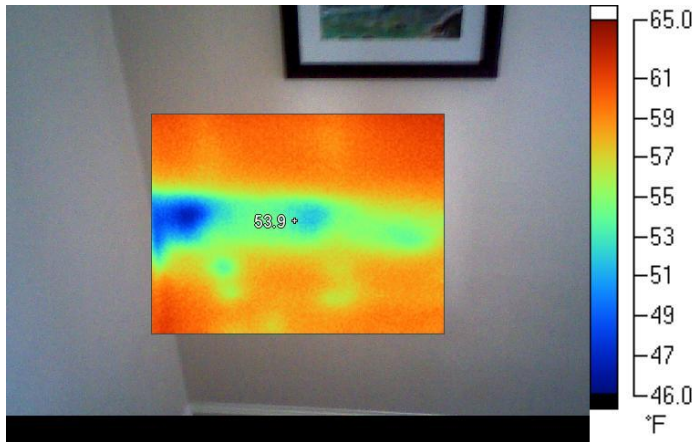
### 6. Airflow Through the Slant Wall

Dense pack tube-method cellulose the slant wall



### 7. Gable End 2x4 Walls

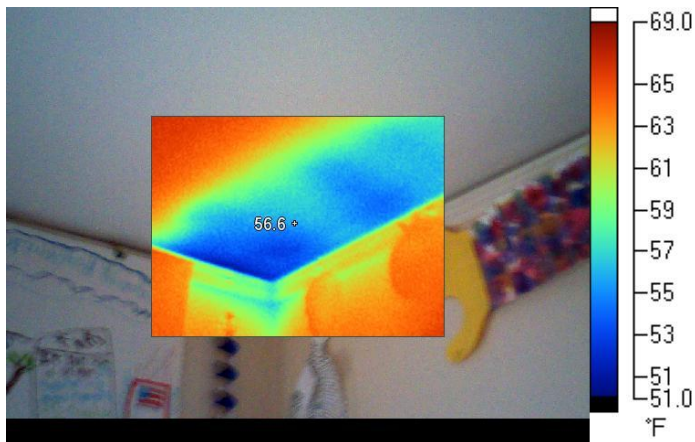
The 2x4 wall extends up to the roof. From the attic, tube injection cellulose pack.



### 8. Gable End Wall Floor Joist

Air infiltration from the outside.

Dense pack tube method cellulose to fill this void.



### 9. Floor Joist of Kneewall Ceiling

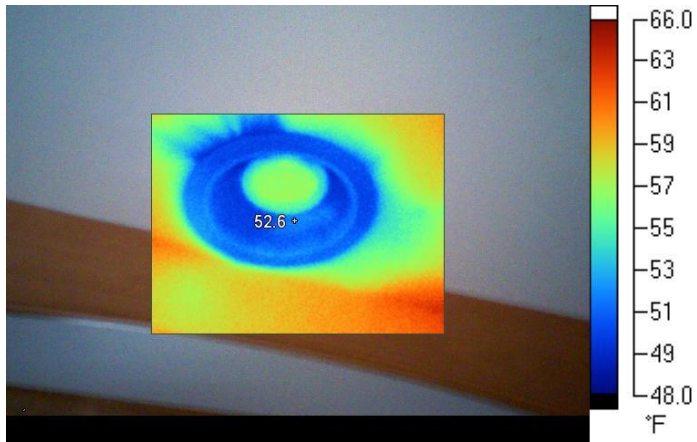
Air infiltration into the ceiling/floor joist cavity under the kneewall. This is an example of why you should pack the floor joist and block off airtight below the kneewall.



### 13. Kneewall Floor Joist Cavity

No pack in kneewall cavity. This is another example of how important a good solid floor joist pack is.

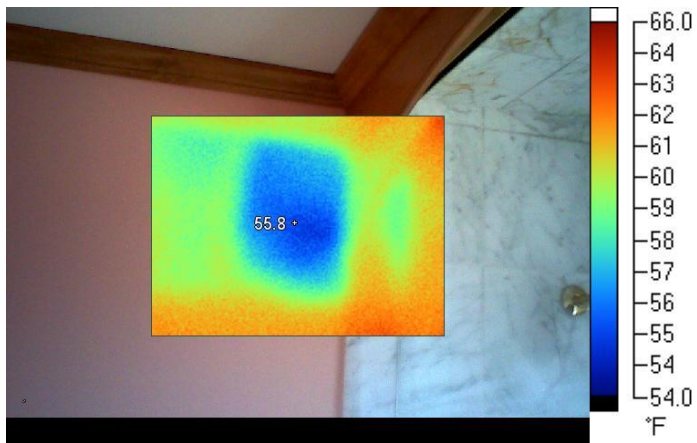
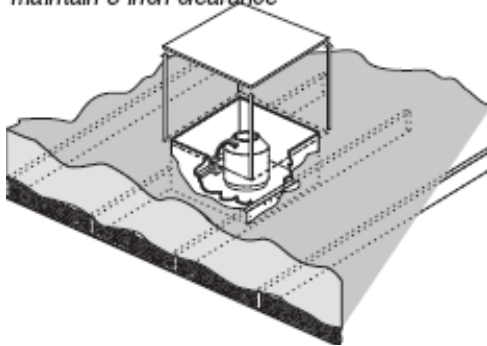




#### 14. Bathroom Below Kneewall Area

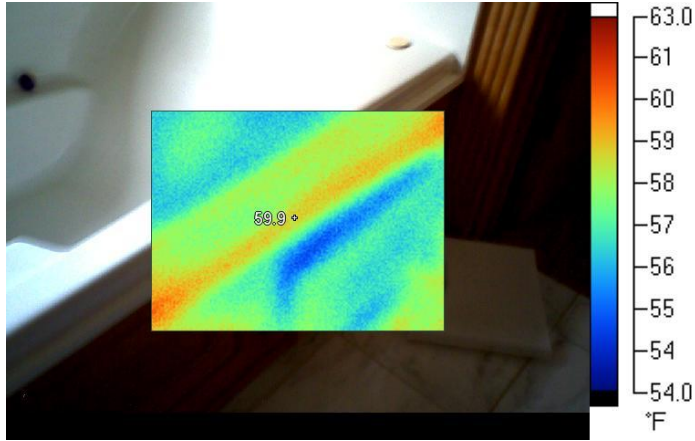
Build box over all recessed lights. Spray foam over the box, along with exhaust fans and ceiling penetrations to seal them airtight. Remove lots of floorboards to identify all of these issues.

*maintain 3-inch clearance*



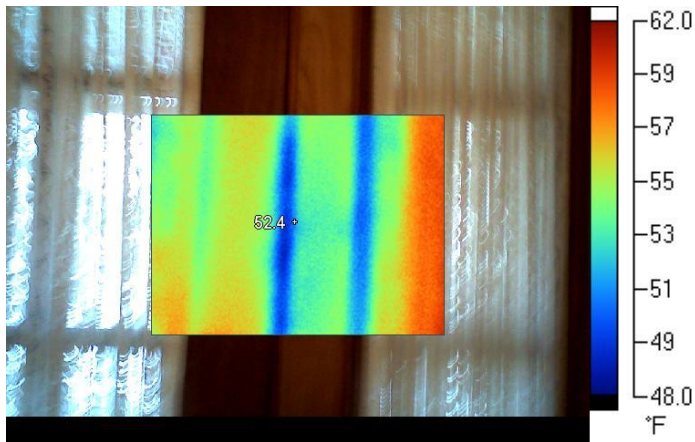
#### 15. 2x4 Wall by Shower

Carefully remove board by 2x4 kneewall to identify and pack these “open” 2x4 wall cavities. (There is another fire stop block in this location.)



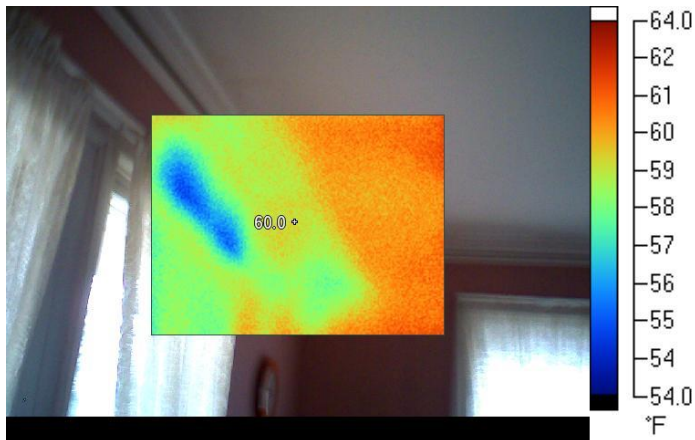
### 16. Door Below Bathtub

Penetrations into the floor cavity and exterior wall cavity provide a direct access to the area under the tub. Identify and seal these areas with plugs when injecting insulation. Be careful to not fill up the bathroom with cellulose. Cellulose will come out from the doors below the bathtub.



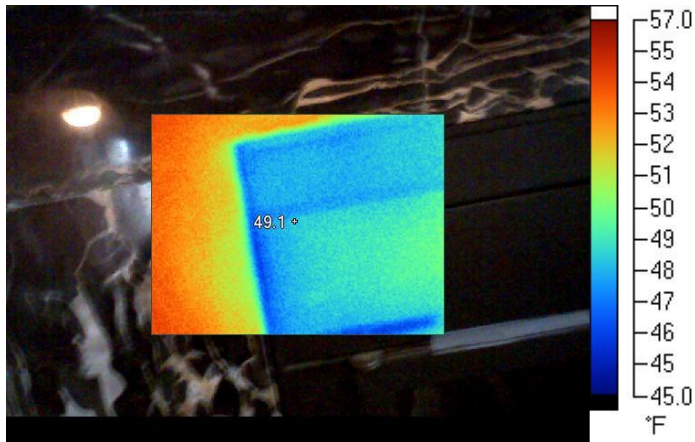
### 17. Front Door

Install new weatherstrip on 3 edges.



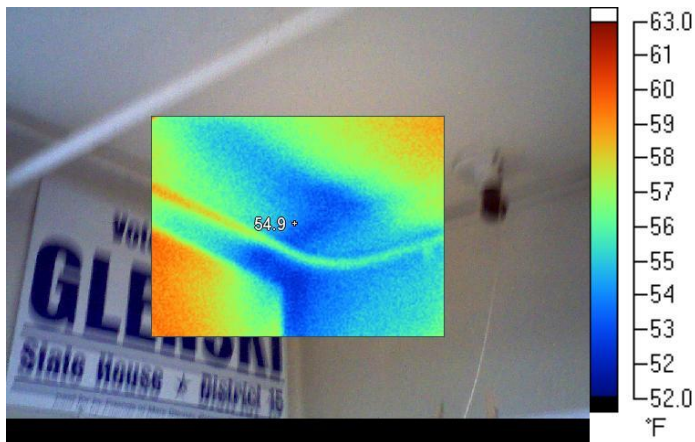
### 18. Ceiling-Gable End

Be sure to do a complete cellulose pack on the gable end wall floor joist cavity. Note: The cavity right next to it is not as "cold" or leaky. This is a strong indication the building is not "balloon" frame construction. Rather its platform construction with lots of fire stop blocks.



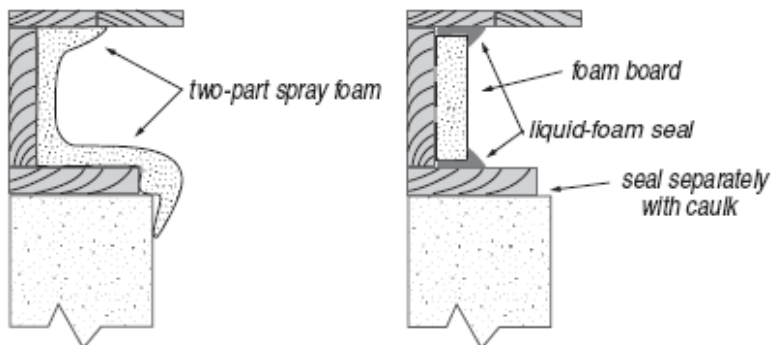
### 19. Fireplace Leakage

Carefully seal shut with black caulk. Use tape to do it neatly.



### 20. Basement Floor Joist

Floor joist is sealed in plaster. Most (80%) of the airflow coming into the house, providing air to flow to the top floor, comes in through the floor joist. The remaining 20% comes in through the lower floor windows. To fix, cut out the plaster around 24 inches or so along the entire perimeter. Spray foam the entire floor joist from the floor board to the cement foundation.



**Foam-insulated rim joists:** Installing foam insulation is the best way to insulate and air-seal the rim joist.

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## **Summary:**

At 10 air changes per hour, this home is drafty, for a home constructed in 1909. Major attic bypass and hidden passageways detected by blower door and infrared diagnostic testing include attic, slant wall, floor joist & doors to knee wall.

## **Recommendations:**

1. Seal and insulate the attic to r-50, insulate slant walls, pack and insulate floor joist, and seal doors to kneewall areas.
  2. Cellulose pack exterior 2x4 walls.
  3. Spray foam interior rim joist.
  4. Replace windows. Be sure to spray foam around the jam. No fiberglass insulation.
  5. Replace old refrigerator.
  6. Seal windows and doors airtight with removable caulk and plastic window kits and door stop seals.
  7. Control moisture levels after sealing up and insulating the home. Main moisture sources are cooking and showering. Summer – 50%, Fall – 40%, Winter – 30%, Very Cold Weather (-20 degrees) – 20%.
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