

Progress Report No. 12

Factor 9 Home: A New Prairie Approach

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1. House construction has progressed. The exterior walls of the building are completed. Photos of the front and back of the house are shown in Figures 1 and 2.



Figure 1. View of the Factor 9 Home from the North. January 25, 2007



Figure 2. View from the southwest. The active solar thermal panels are in a 5 foot tall horizontal band between the upper and lower windows on the south wall of the house. Note that the eavestrough and downspout are installed. The downspout water will be piped into the flexible bladder storage tanks located beneath the basement floor. This stored water will be used for toilet flushing and exterior non-potable uses.

2. A tour was held at the construction site for members of the Saskatchewan Watershed Authority on January 25, 2007. The Watershed authority members were interested in the water efficiency measures and the roof water collection system. The owners have been very generous with their time in showing the house throughout the construction period.

3. The active solar heating panels have been connected and are now delivering heat to the house. A photo of the recycled heat storage tank located in the basement is shown in Figure 3.



Figure 3. Heat storage tank for the solar heating system. The tank has a volume of 517 imperial gallons (2347 litres) Note the wrap around heat exchanger on the lower right half of the stainless steel tank. The glycol solution from the solar panels transfers heat to the tank via this heat exchanger. In an earlier life this tank was used in a brewery.

An infrared photo of the lower part of the heat storage tank is shown in Figure 4.

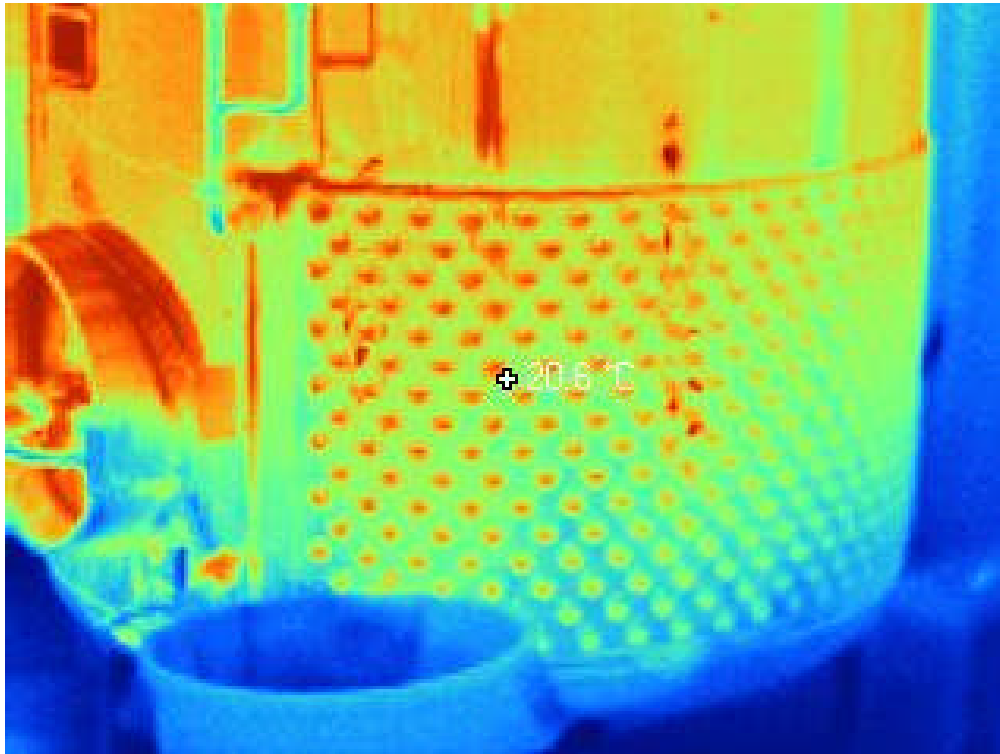


Figure 4. Infrared photo of the heat storage tank. Note the cool blue colour at the base of the tank, and warmer red colour as one moves up the tank. The tank will be insulated with sprayed polyurethane insulation.

4. A second set of air tightness tests were done on the building envelope. At the current level of completion, not all of the final air sealing had been done. Additional air sealing and the addition of trim around the windows is to be done. The air tightness test result was 1.2 air changes per hour at 50 pascals.

5. Air sealing and placement of the ground cover in the crawl space beneath the wood floor in the basement has been completed. A photo is shown in Figure 5.



Figure 5. View of the crawl space beneath the basement floor. A very high degree of air sealing was accomplished with the ground cover membrane. This excellent air sealing will be valuable in limiting radon gas entry into the living space. The orange pipes are the plastic pipes that will extract cooling from the concrete pilings that support the house.

5. Another descriptive talk about the Factor 9 Home project was held at the following venue:

Speaking Venue	Date	Speaker
Construction Specifications Canada Saskatoon Chapter	January 30, 2007	Rob Dumont

5. The air to air heat exchanger for the house has been installed. A photo of the unit, which has a brushless direct current motor to drive the fans, is shown in Figure 6.



Figure 6. Air to air heat exchanger for the house. The unit is located near the outside wall to minimize the length of the insulated ducts to and from outside. The exchanger pulls exhaust air from the bathrooms, laundry area and kitchen, and exhausts to the outside. The outside air that passes through the exchanger is ducted into the return air side of the air handler for the house.

6. The air handler for the house has been installed. A photo is shown in Figure 7.



Figure 7. Air handler for the house. The unit has a brushless DC fan motor. An A coil (water to air heat exchanger) is located in the lower part of the unit. The unit provides space heating by taking hot water from the large storage tank. In the cooling season, it will take cool water from the piping embedded in the concrete piles and the grade beam.

7. Infrared photos of building envelopes

The infrared photo in Figure 8 is of the east wall of the Factor 9 home. The uniform colour on the walls is indicative of the absence of thermal bridges.

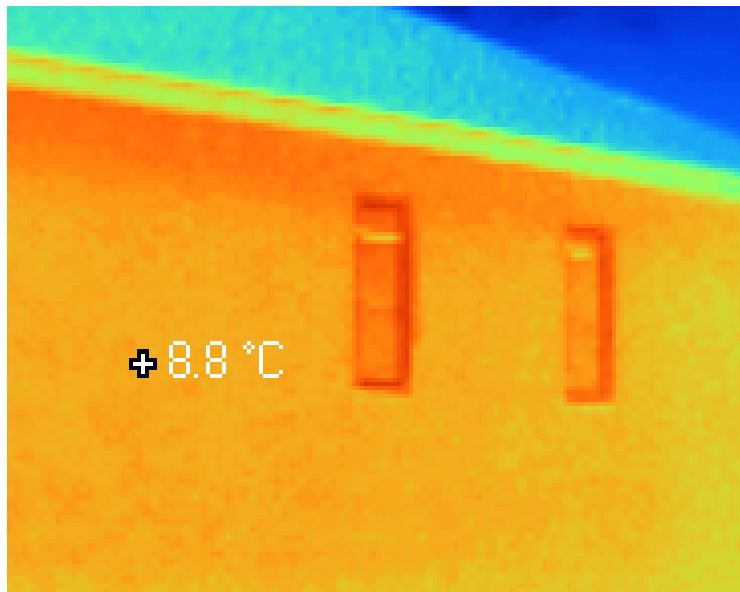


Figure 8. Infrared photo of the east wall of the Factor 9 Home. The two windows are in the master bedroom.

For comparison, an infrared photo was taken of the wall of a conventional new home. This photo is shown in Figure 9.

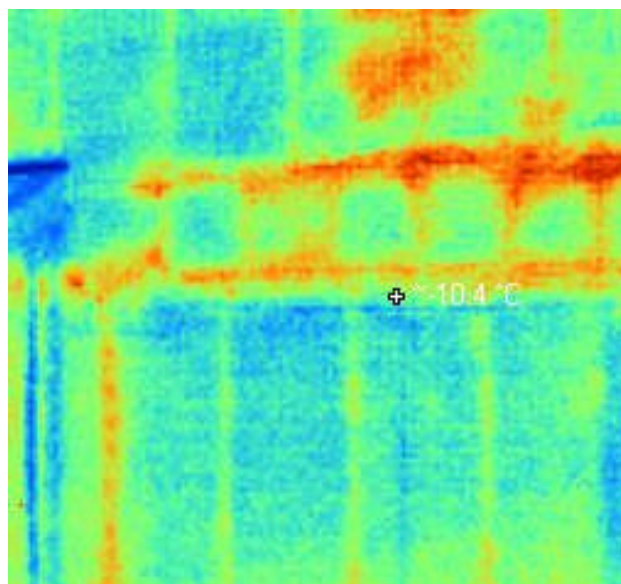


Figure 9. Infrared photo of the wall of a conventional home. Note the red spots indicating heat loss at the rim joist area. The house has two storeys.

The light coloured vertical lines are the wall studs. In addition to the heat loss by conduction, there is likely also some air leakage present at the rim joist area.

8. Instrumentation

Additional instrumentation was added to the data logger. The remaining instrumentation will be added when the mechanical systems are completed. The data logger is able to communicate using an internet port.

Next Steps

- 1. The remainder of the instrumentation will be installed once the mechanical systems are completed.**
- 2. Commissioning checks will be done on the mechanical systems once they are completed.**
- 3. Preparations will continue for the Grand Opening and Open House. The Grand Opening is tentatively scheduled for the last week in March.**

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