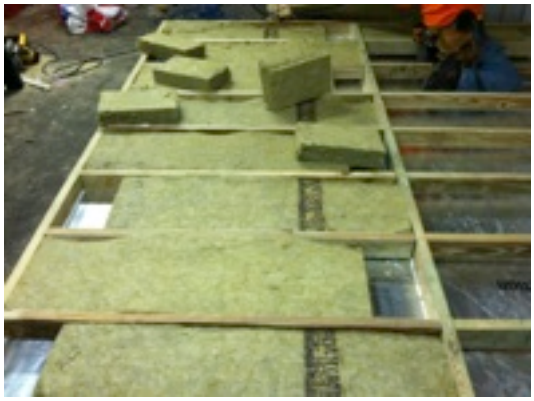
We built a 10’12’ (exterior dimension) walk in cooler for our restaurant. Our restaurant is housed in a 140 year old building, and the basement, where we built the unit, had low ceilings because of the heating and sprinkler pipes. It was not possible to buy an “off the shelf unit, so we decided to build a custom unit.

We started by building a 12’10 foot box out of 2x6 pressure treated lumber on the floor. We secured one side to the brick wall in the basement.

We laid in two layers of 2” Dow stiff insulation with on R value of 7.5 each. We laid the insulation tightly, cocked around all edges and taped all seams. We also laid the second layer of insulation in a reverse pattern so seams did not lay on top of each other.

We then built a frame out of pressure treated 2x4s inside the floor box.

Once that was complete, we laid in Roxul, which is a high-end house insulation, 4” thick. Roxul is not affected by moisture or cold, however it certainly is more expensive than traditional fiberglass insulation. It has an R-value of 16.



We were very careful to make sure the insulation and box were extremely tight and sealed, then we added 3/4 inch flooring plywood over the frame.

The floor was finished with inexpensive vinyl flooring, however you could finish it as you wish.

Next, we built the walls. We built them in the same manner as the floor, however we used 2x4s for the walls. We built the frame of the wall, then attached the 2" thick stiff insulation board to the outside with titebond adhesive and 4 inch screws. We then filled the frame with Roxul insulation. Finally we attached an additional 2" insulation board to the inside of the wall. All seams throughout were cocked with silicone to ensure an airtight seal inside the cooler.

The ceiling was the biggest challenge, as you can see from the above photo. We have lots of pipes in the basement, including sprinklers. The back of the cooler's inside ceiling height is 5'11", and the front of the cooler is 6'3". We built two different ceiling frames and stepped them so we could get as much height as possible. We also built a hatch just in case the sprinkler heads or water shut offs had to be accessed in the future.

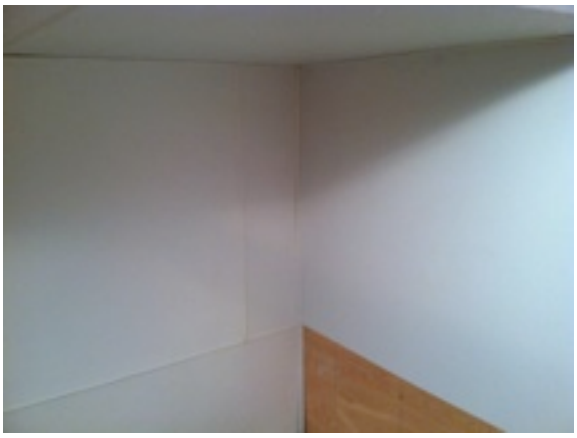
We applied one 2" piece of stiff insulation to the top of the ceiling, then used Roxul to finish. We omitted the second 2" piece of stiff to gain ceiling height. Additionally, since cold sinks, the ceiling does not have to be as insulated as the floor.

If you notice in the above photos, we laid the 2” insulation all the way down the outside of the floor, then built the wall frame on the floor itself, so we would not have any leaking of cold air. We also cocked heavily around these areas to make it airtight.

After the inside layer of stiff insulation was applied, we taped and cocked everything once again. We then applied a layer of 1/4 plywood throughout the interior, so we would have something to attach our finish layer to.

The photo above shows the layers of insulation, the interior plywood layer, and the opening for the air conditioner.

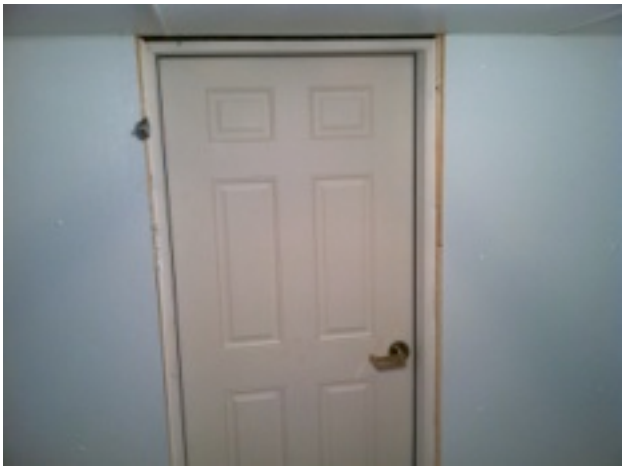
Since we are a restaurant, and there are code requirements for the inside of any refrigeration, our finish layer was FRP, or the stiff plastic wall covering that you see in most restaurants. It is cleanable and non-porous.

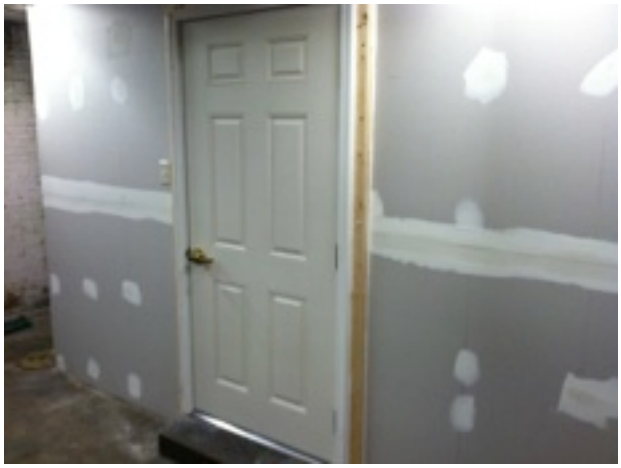


Once the FRP was in place we cocked all the seams with low temperature silicone.

We installed plastic cove base around the floor for ease of cleaning.

Finally, we installed the door. We ordered the best R-value entrance door we could find, made out of fiberglass. The door has a thick gasket around the closure. We installed it into the box and sealed it with silicone. We installed a heavy duty lever handle.





To finish the unit we sheetrocked the outside of the box. This unit is in a basement so we are not too concerned about the outside finishes.

That completed the physical box for our walk in.

MECHANICAL

We installed a vapor light in the box with a glass enclosure for code reasons, and had our electrician install a 208v service and a 110v service under the air conditioner hole.

For the air conditioner, we chose a Friedrich CP24F30, a 24,000 btu unit. http://friedrich.com/products/residential/window/cp We wanted to oversize the unit to make absolutely sure we could maintain 34-38 degrees.

(Our final interior dimensions were 11' wide and 8'8 deep, with a staggered ceiling. 4' of the ceiling is 5'11 and the other 4' is 6'3.

We installed the unit through the hole we cut and siliconed around the edges sealing it in.

We then installed a Coolbot unit that controls the air conditioner. It 'tricks' the ac unit by manipulating the thermostat with a small heater, and uses its own cold control to bring temps down to 32 degrees.

We set the Coolbot for 35 degrees and turned on the ac with the fan setting on high, as instructed in the Coolbot manual.

The walk in was at 35 degrees within 1 hour.

Now we had to play with the system to make sure our temps were as accurate as possible. We wanted to keep the walk in between 34-38 degrees.

We noticed right away that the ac unit was pulling down the room temperature too aggressively. We actually attained temperatures of 26 degrees in several places in the box. (We placed 6 thermostats around the box to measure different areas). Too cold.

We upped the “FIN” setting on the Coolbot to direct the ac to be less aggressive. That helped some, but when the unit cycled, it still pulled the room down below 30.

We then upped the temperature on the Coolbot unit to 43 degrees. The thermostat, which hangs down from the bottom of the unit, must have been in the warmest part of the room.

That worked pretty well, as the unit was now pulling down the temp to just about 30, and cycling back on when it was right around 40 degrees.

Finally, we raised the temperature of the ac unit's thermostat to 70 degrees, as opposed to the lowest setting of 60. And we turned down the fan speed to low. That shortened the cycle and locked the temperature into the range that we were looking for.

We were concerned that the pull down time may be an issue, but this ac, which is built like a tank, pulled down the room 9 degrees in 6 minutes. incredibly fast. (That is with the fan on low)

The cycle time on the ac unit is also impressive. The walk in is in a basement, with an ambient temperature of 63 degrees. In order to maintain a temperature of 32-39 degrees in the walk in, the ac runs about 6 minutes per hour, or about 2.4 hours in a 24 hour period.

Frost up is of zero concern. When the ac turns on, the evaporator shows a very slight sheen of frost, which disappears within minutes of the unit shutting off and just using the fan.

We are extremely happy with the walk-in installation, the brand of ac we chose, and the Coolbot which made it possible to build a highly functioning refrigerator. (Oh, as well as saving thousands of dollars at the same time.)

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