



HOW TO CONSTRUCT A WINE ROOM 101[©]

By - Bruce L. Byrd

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It's Not Rocket Science

Building a wine room can greatly enhance and increase the value of your home or business establishment when done properly. Actually, it's quite simple if you follow a few guidelines.

Wine Storage

Wine should be stored long-term at 55°F (12.7°C) to 57°F (13.8°C) and should maintain approximately 35-60% relative humidity. Therefore, the wine room must be designed to accommodate the cool temperature and high humidity within your home or establishment.

Wine Room Refrigeration

When designing the room, the first thing to decide is whether or not your needs, require a refrigeration system. There is a lot of debate about short-term and long-term storage of wine. If you are a consumer of the lower end bottles of wine, you may not want to even consider a refrigeration system. If you plan on buying, collecting, and aging wine, you should invest in a refrigeration system. Note the term refrigeration. We have seen customers purchase air-conditioning units to cool wine rooms. **Do not do this.** This equipment is not designed to handle the temperature and humidity levels. Without getting too technical, air conditioning systems operate at a 25°F temperature differential (the difference between the evaporator coil temperature and the air temperature). This large temperature differential is designed into air conditioning systems to help dehumidify the air and make it more comfortable to humans. With a wine room, we are trying to maintain a higher humidity level, so we need to design the wine room system for a low temperature differential – meaning, we want to design it with a 5°F to 8°F temperature differential. This helps to maintain the humidity and keeps the corks in the bottle moist, sealing the wine and also helping to prevent the corks from breaking off when it's time to enjoy the fruits of your efforts.

The Vapor Barrier and Diffusion

Due to diffusion or the movement of a matter from an area of high concentration (moist cool air) to an area of low concentration (warm dry air), the most important part of the construction is to install a vapor barrier on the warm side of the walls and ceiling (opposite of a building exterior wall where the moisture barrier is on the inside). Unfortunately, this is the most overlooked part of constructing a wine room. Remember, the wine room is at 55-58°F and the surrounding temperature is 72°F and lower humidity. We suggest a minimum 6 mil plastic, which seals the entire room including the ceiling.

Wall Insulation

All walls must be insulated with a minimum of R-13 (U Factor of 0.08). We recommend using 2" thick EPS (Expanded or Extruded Polystyrene) Dow Blue Styrofoam[®] Foam Board type insulation. EPS is closed cell foam that resists moisture buildup. Due to the high relative humidity in the wine room, we do not recommend using fiberglass batt type insulation. If you are planning on keeping really nice bottles of vino indefinitely, you want to use products that will last.

Ceiling Insulation

All ceilings must be insulated with a minimum of R-19 (U factor of 0.05). We recommend using 3" thick EPS Dow Blue Styrofoam[®] Foam Board for the ceilings.

Doors, Windows, and Glass

All doors must be exterior grade doors with a full weather seal around the perimeter and door sweep. If you plan on using windows, make sure they are *insulated* thermo pane windows. Doors with glass must also be thermo-pane. Make sure and insulate between the jam and studs. We recommend **low expanding** foam in a can. Dow Product “**Great Stuff® Window and Door**” works great. The reason for the low expanding product is that if you use the **Cracks and Gaps®** or **Big Gap Filler®**, the pressure from the expansion will warp your door jams, and you will not be able to shut your nice new exterior door. Seal any other cracks or gaps in the room using any of the products listed above.

Drywall

We recommend using moisture-resistant drywall, or "green board" as it's often called. This is made out of the same gypsum core as drywall. The only difference is that it has a moisture-resistant facing. Green board is sometimes used as an underlayment in wet areas such as a bathtub surround or shower. It's installed the same way as standard drywall and works great for your wine room. Keep in mind that green board is **not waterproof**, but is **moisture-resistant**.

Light and Lighting

When designing your wine room, make sure to keep it out of direct sunlight. Sunlight is an enemy of wine. This is why most red wines come in dark bottles. When adding lighting, try to keep it to a minimum wattage to do the job. If possible, low voltage lighting is the best. Any lights you add also add to the refrigeration load! We're trying to make this room like a nice cool humidified cave.

Noise/Vibration Considerations

Beware of the contractor that wants to sell you a standard refrigeration system for your wine room. There are two major problems with using a walk-in cooler type system. First is a noise and vibration consideration. Standard walk-in cooler systems use high rpm and high velocity fans that are quite noisy. Unless you want to hear a really annoying hum day and night, do not install one of these systems! Second is what we discussed earlier about temperature differential. Temperature differential is critical to maintaining a higher relative humidity. When we design a custom ducted system, we utilize controls and a design for a low temperature differential. We also recommend using cooling units from Breezaire products. We have found these units do what they say they will, and operate very quietly due to their internal insulation construction.

Making Cold vs. Removing Heat

One common misunderstanding about any type of refrigeration process is how most people see it. When we go from a warm area into a cool room, we see it as making cold air. This is not how refrigeration works. The definition of refrigeration is as follows: **The Removal and Relocation of Heat**. Nothing more, nothing less. So when we are cooling a wine room, we are simply taking energy in the form of heat and relocating to another area, which is sometimes outside. This is why you feel warm air coming off of the outdoor condensing unit of your home air conditioning system.

Cooling Load Calculations and External Loads

When designing a wine room, it is very important to have an experienced designer/engineer determine the cooling load requirements for the room. Having a system that is oversized is just as bad as having a system undersized. If you guess on the size, you might not be very happy with the performance of the system. At Rocky Mountain Mechanical Systems, Inc. we have specialized software that helps us design these systems to operate at peak efficiency.

That's all there is to it. If you have further questions, please contact our professional sales staff to assist you with the design, sales, and installation of your wine room.

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