



---

1059 Colorado Blvd. • Los Angeles, CA 90041 • (323) 259-0420 FAX 259-0429 envref@pacbell.net

Via email and fax

February 23, 2009

Ref. # 200902-R1

Subject: Refrigeration and Dehumidification of 40° F. / 25% RH "Storage Room"  
and 60° F. / 25% RH "Laminating Room"

We are pleased to submit our (revised) proposal on the above-referenced project. For clarity, I have separately priced the cooling and dehumidification for each of the two rooms.

"STORAGE ROOM" (approx. 20' x 12' x 14' high)

#### Refrigeration System

The refrigeration system will consist of a Keeprite K500M8 condensing unit (with a 5 hp Copeland semi-hermetic compressor) and one Keeprite KMP245MA medium-profile evaporator blower. Air will be used for condenser cooling and R-507 for refrigerant. The combined system will provide 46,230 btuh of cooling and circulate 6,480 cfm of air. The system will maintain 40° F. in the room with an approximate 71% safety factor. The refrigeration system will have a sophisticated hot gas bypass system so that it runs continuously. This will maintain both temperature and humidity stability in the room and prevent "short cycling" of the refrigeration caused by the heat load from the dehumidifier.

#### Dehumidification System

The dehumidification system will consist of a Munters HCD-600 dessicant wheel dehumidifier to maintain 25% RH in the room. The unit can be mounted inside or outside of the room and will provide 600 cfm of air and remove 2 lbs. of moisture per hour.

"LAMINATING ROOM" (approx. 40' x 40' x 14' high)

#### Refrigeration System

The refrigeration system will consists of a Keeprite K3000M8 condensing unit (with a 30 hp Copeland semi-hermetic compressor) and two Keeprite KMP355MA medium-profile evaporator blowers. Air will be used for condenser cooling and R-507 for refrigerant. The combined system will provide 260,890 btuh of cooling and circulate 20,600 cfm of air. The system will maintain 60° F. in the room with an approximate 30% safety factor. The

refrigeration system will have a sophisticated hot gas bypass system so that it runs continuously. This will maintain both temperature and humidity stability in the room and maintain constant pre-cooling and post-cooling for the dehumidifier.

### Dehumidification System

The dehumidification system will consist of a Munters HCD-1125-PLUS dessicant wheel dehumidifier to maintain 25% RH in the room. The dehumidifier will be connected to the refrigeration condensing unit described above for continuous pre-cooling and post-cooling of the process air. The dehumidifier will provide 2,100 cfm of filtered (30/65%) dry make-up air into the room to maintain positive pressure. This presumes that the two 13' x 6" openings will have some kind of door or heavy curtain to reduce the amount of dry air lost through the opening. The unit can be mounted inside or outside of the room and will remove 33 lbs. of moisture per hour.

### Items Included

1. Refrigeration equipment as described above.
2. Dehumidifiers as described above.
3. A custom UL control panel for each room to display and maintain the temperature and RH. Each control panel will have two Honeywell UDC2500 digital controllers, equipment status lights and audiovisual alarm indication.
4. Refrigeration and hot gas lines from the condensing units to the evaporator blowers up to 60' away.
5. Refrigeration lines from the condensing unit to the dehumidifier for pre and post-cooling ("Laminating Room" only).
6. Insulated ducting to and from the dehumidifiers as needed.
7. Condensate drain line piping from the evaporator blowers and the Munters HCD-1125 dehumidifier to a customer provided drain or floor sink up to 30' away.
8. Condensate pump if needed.
9. Temperature and humidity probes and wiring in conduit by others.
10. Armaflex insulation on refrigeration suction lines.
11. Aluminum jacketing on pipe insulation where exposed to sunlight.
12. Pressure testing and evacuation of refrigerant lines.
13. R-507 refrigerant.
14. Start-up and adjustment of refrigeration equipment.

15. Factory start-up and adjustment of the dehumidifiers.
16. Crane lift of refrigeration equipment onto roof.
17. Roof penetrations.
18. 90-day labor and 1-year parts warranty on all items provided.

Items Not Included

1. Electrical of any kind.
2. Insulated enclosures and/or doors.
3. Plastic strip curtains.
4. Equipment pads or platforms.
5. Structural engineering or reinforcement of building roof.
6. Permit fees.

Terms

25% with order

25% upon delivery of refrigeration equipment, control panels and dehumidifiers.

25% upon completion of refrigeration and dehumidifier installation.

25% upon startup.

We look forward to working with you on this project.

Very truly yours,

ENVIRONMENTAL REFRIGERATION

*Richard Norman*