

EQUIPMENT STARTUP CHECKLIST

For Ground Water Source Heat Pump Systems

Equipment type: Ground source heat pump (GSHP)
Equipment designation: GSHP-1, GSHP-2
Barcode designation: 111111
Area served: Condo building
Equipment location: Equipment room

ELECTRICAL INSPECTION

[Y] [N]

- Electrical completed and disconnect install per code compliance. [Y] [N]
- Starter and wire sizing per contract documents. [Y] [N]
- Disconnect furnished and installed. [Y] [N]
- Terminations and panel circuit labeled. [Y] [N]
- Voltage and motor amps (per phase) documented. [Y] [N]

EQUIPMENT INSTALLATION (PER CONTRACT DRAWINGS AND SPECIFICATION)

[Y] [N]

- Is there sufficient access for equipment installation? [Y] [N]
- Responsibility assigned to equipment manufacturer for reassembly. [Y] [N]
- Piping complete at unit. [Y] [N]
- Electrical connections installed and complete. [Y] [N]
- Adequate water capacity for system startup. [Y] [N]
- Are electrical connections tight and secure? [Y] [N]
- Seismic restraints required and complete. [Y] [N]
- Manufacturer's O&M available. [Y] [N]
- Manufacturer's startup sheets attached with this checklist. [Y] [N]
- Warranty certificate available. [Y] [N]

DISTRIBUTION (TO AND FROM EQUIPMENT)

[Y] [N]

- Piping pressure tested per contract documents. [Y] [N]
- Piping adequately supported independent to the heat pump. [Y] [N]
- Water piping properly sized. [Y] [N]
- Insulation completed. [Y] [N]
- Installation per contract documents (specification and details). [Y] [N]
- TAB report (and field notes) attached with this checklist. [Y] [N]
- Identification per contract documents. [Y] [N]

AUTOMATIC CONTROLS

[Y] [N]

- Temperature controls complete. [Y] [N]
- Control "points" confirmed. [Y] [N]
- Electrical system interlocks complete. [Y] [N]
- Unit furnished controls interfaced with owner's BAS computers. [Y] [N]

ENERGY EFFICIENCY AND OTHER ADVANTAGES

[Y] [N]

- Possibility to reduce peak electric charges. [Y] [N]
- More efficient energy consumption vs. DX electric cooling. [Y] [N]
- Consider use of underground loops to transfer heat, with no external venting and no air pollution. [Y] [N]
- Provide efficient climate control, therefore reducing emissions. [Y] [N]
- Possibility to reduce mechanical room space by 50% to 80%. [Y] [N]

DESIGN REVIEW AND TRICKS OF THE TRADE

- Complete a well test for potential capacity data.
- Confirm there is safe access to the equipment.
- Confirm there is manufacturers' recommended clearance around equipment.
- Spot-check cooling capacity by dividing square feet by tons cooling for sq ft/ton.
- Spot-check heating capacity by dividing Btuh load by square feet for Btuh/sq ft.
- Spot-check total pump head for excessive/inadequate water pressure drop.
- Attach equipment schedule and design criteria to checklist.
- Attach sequence of operation to checklist.
- Attach associated contract detail drawing to checklist.

REFERENCE

- Refer to *2004 ASHRAE Handbook – Systems & Equipment* Chapters 1, 4, and 5 for additional information relative to central chiller plants.
- Refer to *2004 ASHRAE Handbook – Systems & Equipment*, Chapter 45, "Unitary Air-Conditioning and Heat Pumps" for additional information relative to ground source heat pumps.

NOTE

- Refer to equipment manufacturers' literature for additional data and requirements.
- Refer to the April 2007 *Engineered Systems* "HVACR Designer Tips" for more information on design review and D-B of GSHPs. **E5**

If you have any comments, suggestions, or questions regarding this designer checklist, contact Amanda McKew at amckew@rdkengineers.com.

This column is meant to provide some basic guidelines for good design. Always consult all necessary codes and resources relevant to each particular project.

