

4.0 PERMITS AND APPROVALS

Solar energy work, like every trade, is controlled and affected by a large number of codes, ordinances, and other legal requirements. It is often even more difficult than normal to correctly and completely comply with all the applicable legalities because they have not yet been applied and tested in the solar industry.

- The legal requirements affecting traditional trades, such as plumbing and HVAC, are generally clearly defined and known to all the involved parties. In the solar industry, the applicable requirements are often not clear and not agreed upon.
- Being unfamiliar with solar installations, people often expect or fear the worst. This results in unnecessary requirements and longer than expected delays in obtaining approvals.
- Some cities have special testing and certification procedures and agencies to which major materials and/or components must be submitted for approval before they can be used in that city. Generally such approvals take months; some solar components may not be approved.

If there has been little commercial solar energy work in your area, or if you have done little commercial solar work, you can expedite the permit approval process by taking the following steps:

- Go to the the Building Department with the design and installation drawings. Find out what its requirements are and how they can best be met.
- Have the inspector come to the job site (if existing) before filing for permits. Find out what his concerns are.
- Use standard designs and materials already approved by the jurisdiction. Sometimes a building department or other key jurisdiction will review and approve system design/installation details (e.g., collector rack materials and construction) that are repeatedly used in solar installations, then waive subsequent review and approval if the standard details are used.
- Keep track of the particular solar requirements in each jurisdiction in which you work.
- Hav on call a good mechanical and structural engineer experienced in dealing with local jurisdictions. He should be creative, flexible, and able to respond quickly to problems raised in the permit approval process. Remember, however, that he may be totally unfamiliar with solar system installation, operation, and performance; in this case, you must work with him to find solutions to solar installation problems.

Problems with permits and approvals most often arise regarding:

- UL approvals and IAPMO listings. For example, it is sometimes hard to get large UL-approved pumps; a UL-approved motor can be put on a wide range of pump bodies and the body you need may not be UL-approved, so you will have to use another, less-than-optimum body.
- Perceived potential contamination of potable water by solar fluids (sometimes even in drainback and recirculation systems), resulting in required design changes such as using double-wall heat exchangers and backflow preventers on cold water supply lines.
- Large, unusual collector racks.

Other requirements for permits and approvals that may affect the solar installation are:

- Fire codes
 - Access to fire escapes, firefighting access requirements, and restrictions on usable roof area to allow building occupants to stand on the roof may affect collector layout.
 - Fire rating of a concrete roof may affect the type of connections that can be used. With one rating, wedge anchors can be used; with a different rating, they cannot.
 - Fireproofing requirements may affect rack materials and construction.
 - The fire department's concern with tripping may affect blocking requirements for pipe runs on the roof.
 - Any structure built as part of the system (e.g., tank sheds or collector enclosures) may have to comply with fire codes. Note especially the minimum burn time construction requirements. The interior surface of pebble bed storage boxes (floor, walls, and top) must conform with codes for fire resistance of warm air circulating systems.
- Planning ordinances. Because of aesthetic concerns and the review processes involved, planning departments may cause a problem and delay when the collectors are highly visible; people do not want collectors to block their view and, generally, do not want their view to be of collectors.
- Codes, covenants, and restrictions (CC and Rs) of residential subcommunities (e.g., condominium associations). As with planning ordinances, the concern here is mainly aesthetic and arises when the collectors are highly visible.
- Height limits. The building may comply with local height limits, but the top of the collectors may be above the limit.

- Setback requirements. These primarily restrict the distance of the collectors from the edge of the roof, and tanks from side walks and roadways.
- Roof connections. Restrictions regarding the types that can be used and how they must be done are often especially severe if lag-bolting of racks to the roof structure is used.
- Special earthquake requirements. The primary concern is for storage tanks.
- Miscellaneous
 - Permits may be required to block streets for deliveries or cranes; weld certification requirements may be specified if welding is involved in building the collector racks; ASME code requirements may be specified for pressurized tanks; a relief valve discharge may have to be piped to the ground; a sensor wire may have to be run in a specified conduit; aluminum racks may have to be anodized in coastal areas; personal or legal requirements of the system owner may be added to the specification.
 - If the solar energy system is for an existing apartment building, the tank may fit well into a parking space under or adjacent to the building. However, apartment buildings are often constructed with exactly the number of spaces required by law, so no space may be legally available. Check with the building department.

5.0 MATERIAL ORDERING, DELIVERY, AND STORAGE

5.1 MATERIAL ORDERING

Ordering components and materials for a solar energy system is handled like any other service hot water or HVAC job. Choose component types and manufacturers' models that meet the project specifications and that the local jurisdiction is familiar with and approves routinely; this will help avoid problems in obtaining permits and approvals for solar systems.

Lead times for solar items and their availability at different times of the year may be longer than those for components with which you are familiar. Lead times may vary among different manufacturers of the same type of solar component, especially collectors. The solar items most likely to have long lead times are collectors and any custom-made components such as the collector support structure and tanks.

Do not order materials for the collector support structure until the structure has been approved by the building department, and all other required permits and approvals have been obtained as well.

5.2 MATERIAL DELIVERY

The solar items most likely to cause delivery problems are collectors, storage tanks, and rocks for the pebble bed. Materials for collector racks, especially if pre-assembled, can also require special attention. All these items are bulky, heavy, and often require special equipment and handling to get them delivered, off the truck, and in place.

Determine the delivery conditions at the site, especially

- Traffic patterns in the vicinity of the building, especially if a crane will be used.
- Access to the building and grounds, considering both the hours available to accept deliveries and the times that would cause the least occupant inconvenience.
- The space available to accept and store deliveries until needed.

Determine how the major items will be packaged/crated and shipped, especially

- The size and weight as delivered, so the appropriate equipment and manpower for unloading and handling can be determined.
- The shipper and type of truck (most items will be shipped by common carrier, but collector and tank manufacturers often use their own trucks).

Consider shipping collectors and tanks directly to the site. Have the collectors palletized by the supplier so the total weight of each pallet is acceptable (both for the crane used and for the roof). Use the crane for unloading the pallets of collectors directly onto the roof. If possible, when unloading the tank, have the crane set it directly in place. An even better situation is if the collectors and tank can be delivered at the same time and unloaded by one crane.

5.3 MATERIAL STORAGE

It is generally cheaper to have major solar components and materials shipped to and stored on site. Alternately, collectors and tanks can be shipped to a local drayage company, as it has the personnel and equipment to move heavy items into place safely and efficiently. The drayage company stores the items, then delivers them as needed to the site.

Collectors

Store them well away from the vendor drop area and other heavy traffic routes.

Protect the glazing from breaking by leaving collectors palleted and/or with packing material (e.g., cardboard) in place until they are mounted on the support rack.

If the collectors are shipped and left in cardboard boxes, protect them from rain.

Do not leave collectors in the sun with uncovered glazing, as they will stagnate; do not leave them in the sun with paper or plastic covering that will fuse to the glass.

If collectors are laid individually on the roof or racks without securing them, they can blow off in a strong wind. Secure them if pallets are broken down or, ideally, leave them palleted until they can be fastened in place on the racks. If left palleted, be sure that the roof is structurally adequate where the pallets rest.

When stacking collectors, always use spacers, unless the collector manufacturer has specifically designed the collector frame so they can be stacked directly one on top of another.

Storage Tank

Follow the manufacturer's instructions with regard to the storage of tanks with epoxy-phenolic linings (see Section 6.4.2.1).

If the tank must be left open to the atmosphere, cover openings with a fine mesh screen to keep out foreign material.

Pipe/Duct Insulation

If stored outside, protect it from rain, sunlight, and crushing.