

Roofs: The First Step in Effective Energy Upgrades for La Luz Units

As climate change and alternative energy sources are becoming high profile topics in the nation's political and economic discourse, the question of how La Luz units can be upgraded for energy efficiency and self-sufficiency seems ever more relevant. Such upgrades offer an immediate benefit: improved comfort.

The most effective way to improve energy efficiency and improve comfort in La Luz units is by increasing the insulation thickness between the ceiling and the roof and adding insulation on top of the roof deck. Adding insulation to the interior of the walls is difficult as there are only a few instances where this can be accomplished without creating awkward transitions at doors and windows.

La Luz units came with about 6" of insulation above the ceiling and below the roof deck. Although the 6" (R-19) of fiber insulation is called out on the original architectural drawings and is so installed in Berm units, living units constructed later may have only 5". Removing a La Luz roof deck may reveal areas with no insulation at all or gaps between the insulating batts. The insulation tends to degrade and collapse with time so the original thickness may have been 6" and become compressed. It is also possible that a reduced thickness was installed originally to save money.

The usual procedure for roof replacement at La Luz is to simply remove the existing gravel and to place the new roof (either built up tar and gravel or TPO) on top of the existing asphalt felts. If TPO is installed, it is likely that 2" of rigid foam insulation is laid on top of the old roof before it is finished with TPO. This affords a modest thermal improvement. Removing the felts to expose the roof deck is a dirty and expensive job but it will most likely reveal a rotten roof deck. Removing the plywood deck is necessary to gain access to the insulation. Removal of the insulation is another filthy, expensive and thankless job but worth the time and expense if maximum comfort and efficiency are to be achieved.

The area between the roof deck and the ceiling is 10". Filling this cavity with 10" of glass fiber insulation will optimize the insulation potential under the roof deck. After the deck is removed, the deck is typically replaced with new plywood or OSB Oriented Strand Board. Typically, there will be rotten joists that must be repaired. The rot occurs when moisture gets trapped in the cavity between the original batt insulation and the roof deck, either from roof leaks or from condensation that occurs in the wintertime on the lower side of the roof deck (due to lack of insulation between the roof and the ceiling). Filling the cavity with 10" of insulation and insulating on top of the deck will eliminate the potential for moisture accumulation due to condensation and extend the life of the new roof deck.

Having the roof deck removed offers the opportunity to correct haphazard remodeling wiring and plumbing mistakes as well as replacement of exhaust fans and other rooftop accessories.

The new deck can accommodate up to 10" of expanded polystyrene insulation although this will vary as the roofer varies the slope for proper drainage. The roofer will order the foam blocks with a taper that will allow for proper sloping of the new roof. On top of the foam blocks, a final 2" layer of polyisocyanurate insulation board will be added. The TPO or replacement tar and gravel roof can then be put down. This formula will result in a total of approximately 20 to 22" of insulation above the ceiling with an insulating value in excess of R-80 instead of the original R-19 for the original 6" (or less) of rock wool. This insulating upgrade will allow for replacement HVAC equipment with a significantly smaller capacity. This reduces the cost of new heating and cooling equipment while improving performance and comfort. It is essential that the HVAC equipment be properly sized according to the building's insulating values.

Insulating and sealing at the parapet with expanding insulating foam is also an important detail. As much care as can be taken to fill every void and crack, and holes where wiring passes through joists, will reduce air movement and improve performance. La Luz wires cables tend to be bundled together as they run under the roof deck from the breaker panel. Sealing around these bundles to avoid air movement between the joists is indicated. Taping the joints between the new OSB or plywood deck sheets requires minor effort but further reduces the possibility of air movement under the roof. The devil really is in the details and a La Luz roof structure is full of both devils and details. Finding a roofer who will give proper attention to the devilish details is another challenge.

Replacing windows and glass doors with double pane or triple pane glazing will also have a huge impact on comfort and energy efficiency. Certain interior walls can be furred out successfully to add 2" of expanded polystyrene insulation. As mentioned above, these walls will need to be those that do not directly intersect door or window jambs. The greatest improvement will be achieved by aggressively insulating the roof.



