10

Plumbing and Electrical

Energy Code Requirements

Sealing penetrations

All penetrations through the insulated envelope of the building must be sealed (see Chapter 11). This can be done by individual subcontractors, but is more likely to be done by the builder. Electricians and plumbers can help by cutting holes slightly oversized to allow room for spray foam (see Figure 11.4), and by minimizing unnecessary penetrations.

Recessed lights

Recessed lights in insulated ceilings must be rated for Insulation Contact ("IC" rated), and must be airtight as outlined in ECCCNYS 502.1.3. Don't forget to include gaskets on the trim ring or other components that may be specified for the system to be rated for airtightness. The airtightness standard of 2.0 CFM, (ASTM E 283) is the same that was adopted by Washington state. Units with a label that references this ASTM standard, MEC, ECCCNYS, or Washington State's energy code will be accepted. This requirement can also be satisfied by installing sealed, airtight boxes over recessed lights.

Service Water Heating (ECCCNYS 504)

If vertical pipe risers are used with conventional stand alone or indirect fired hot water tanks, heat traps (if not integral to the water heater) must be installed on both the inlet and outlet sides of the water heater. Tankless coils are prohibited unless calculations demonstrate an acceptable rate of standby loss.

All pipes in recirculating hot water pipe loops must be insulated to limit heat loss. Generally, 1/2 inch of insulation is sufficient. For pipes in excess of 1" in diameter or for service temperatures in excess of 140°F, see ECCCNYS Table 504.5. Circulation pumps must be equipped with shutoffs.

Tub/shower units on exterior walls

Be sure these have an adequate air barrier in place before installing the unit. This includes insulation and vapor retarder as well. See Figure 11.8.

ENERGY STAR

New York ENERGY STAR Labeled Homes must include a minimum of 600 kilowatt hours (kWh) of electrical savings from ENERGY STAR labeled lighting and appliances. If the home is a Model or Display home, the home must include a minimum of 750 kWh of electrical savings. Furnaces and air conditioning systems that include Electronically Commutated Motors (ECM), which operate at much higher efficiencies than conventional motors, will also qualify for electrical savings. The following table summarizes the credit that can be applied to each of these products.

Table 10.1 Electrical Savings Attributable to ENERGY STAR Labeled Lighting, Appliances, and ECM Motors

Product*	Electrical Savings (kWh)
Compact fluorescent light bulb	50 each
Fluorescent light fixture	75 each
Refrigerator, Freezer, Dishwasher, or Clothes Washer	150 each
ECM Motor	300 each

* Lights and appliances must be ENERGY STAR-rated.

Any combination of the above can be used to achieve the savings requirement (e.g., six light fixtures or one refrigerator and one ECM motor), as long as the savings from compact fluorescent light bulbs do not account for more than 300 kWh of the total.

The New York ENERGY STAR Labeled Homes program also has minimum requirements for the efficiency of hot water heaters (see Table 10.2). The minimums vary according to the size of the tank and the venting configuration. Tanks that feature power venting (also referred to as a "mechanically-assisted" venting system) or sealed combustion are stongly encouraged. See page 75 for a summary of the benefits of using sealed combustion equipment.

Integrated heating/hot water systems can save energy and also save on installation costs. If you have a boiler, using an indirect fired water storage tank is much more efficient than a stand-alone tank, uses only one burner to do both jobs, and needs only one venting system. If forced air is desired, a boiler can provide heat through a "hydro-air" fan coil. In a

Table 10.2 Minimum Energy Factor (EF) for Water Heaters in New York ENERGY STAR Labeled Homes

Storage Capacity (Gal)	Minimum Energy Factor (EF)	
	Natural Draft	Power Vented or Sealed Combustion
< 60	0.61	0.58
59-99	0.53	0.53
> 99	0.48	0.48

house with small heating loads, the fan coil can be supplied by a small, high efficiency, stainless steel water heater with a heat exchanger. This approach also saves space. Avoid tankless coils that are built into boilers for water heating; they have the lowest efficiency of all.

Plumbing and electrical penetrations are also a concern because they can be major sources of air leakage in buildings. In addition, pipes and wires in exterior walls can make it difficult to install insulation properly. Keep plumbing out of exterior walls whenever possible (especially if the walls are being insulated with fiberglass batts). Try to run electrical wires low across walls, so it is easier to split batts on either side. If the walls are insulated with a blown- or sprayed-in insulation, there is less concern about interference. It's still a good idea to run plumbing in interior walls, or stay as close as possible to the interior in a 2x6 or larger wall, to avoid problems with freezing pipes.