



**Reference Guide**  
**Existing Multi-Family Program**

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## **Preface**

“Green Building is the design, construction and operation of buildings utilizing resource efficiency measures. It not only stresses water and energy efficiency, but also encourages indoor air quality, natural lighting, chemical free and earth friendly building materials.”

“Green building involves reducing energy use, using a common-sense approach that should appeal to both builders and conservationists,” said Steve Stagliano, Manager of Energy and Business Services.

This reference guide will provide a detailed explanation of GRU’s checklist standards in an effort to enhance the goal of achieving the green building certification.

This voluntary program is to develop and implement a certification program for energy efficient and sustainable building construction practices. The program does not replace the requirements of the Florida Building Code. The program’s objective is to improve the efficiency of water and energy use and to encourage the use of earth friendly building material of multifamily dwellings. The program will target apartments built prior to 1993 because the Florida Building Code during that time did not define in detail the qualifications for quality-sealed ducts. In 1993, the Florida Legislature passed the Building Energy Efficiency Ratings Act. This act, as later amended, required a statewide uniform system rating the energy efficiency of all buildings.

## Guidelines

A unit is certified green once it meets the required standards in the checklist. Please note that all standards are not required; only the required minimum. Each unit must pass a blower door and duct blaster test; performed by an independent certified rater. Duct leakage should be no more than ten percent of the total cfm capacity of the air handler when the system is pressurized at 25 Pascal (PA).

Each unit must have the HVAC system tested and inspected by a licensed AC contractor. This test will include thermostat calibration, inspection and cleaning of the evaporator and condenser coils, testing and adjustment of refrigerant charge, and measurement of temperature across the evaporator coils.

Gainesville Regional Utilities (GRU) will perform random inspections of units.

Measures that cannot be verified visually must have supporting documents.

All test results related to the mechanical and duct system must be documented.

If the owner decides not to make the necessary improvements based on the test results, a rebate and certification for that unit will be withheld.

Each apartment complex that participates in this voluntary program will receive a Certificate of Participation and a \$250 incentive for each apartment unit that completed and passed the blower door and AC testing. In addition to this incentive there are advertising benefits and other rebates that are rewarded if they apply. These rebates include:

**Natural gas water heater:** Replace an electric or oil water heater with energy efficient natural gas model. \$200

Add an additional natural gas water heater: \$200

**Natural gas central heat:** Replace an electric or oil furnace with an energy efficient natural gas central heat system using an electronic ignition.

Qualifications: You must have an existing gas water heater or be replacing a water heater with a natural gas model. \$300

**Natural gas range and natural gas dryer:** Replace an electric range or dryer with an energy efficient natural gas range or dryer.

Qualifications: You must have an existing gas water heater or be replacing a water heater with a natural gas model. \$50

**Natural gas central air conditioning:** Replace an electric air conditioner with energy efficient natural gas central air conditioning system using an electronic ignition. \$750 Allowance

**LP Gas conversion:** Convert existing LP gas appliances to use natural gas.

Qualifications: You must have an existing gas water heater or be replacing a water heater with a natural gas model. Up to \$150 allowance not to exceed the actual cost of conversion.

**Solar heating:**

Passive Solar Systems must be double-glazed integrated collector storage type.						
System Capacity	18,000	24,000	30,000	36,000	42,000	48,000
Rebate	\$300	\$330	\$360	\$390	\$420	\$450

Active Solar Systems must be closed-loop types.			
System Capacity	36,000	48,000	60,000
Rebate	\$300	\$375	\$450

### **Disclaimer**

**This reference guide is neither a substitute for the Florida Building Code nor for sound judgement. We ask that contractors and owners in the course of upgrading or remodeling apartment structures consider these items. Gainesville Regional Utilities (GRU), an agency of the City of Gainesville, provides these guidelines. All information in this reference guide is provided “as is” without any warranty of any kind, expressed or implied, unless otherwise explicitly stated. GRU makes no representation warranties or guarantees as to the quality, truth, accuracy, completeness or suitability for any purpose of any materials contained in this guide. GRU assumes no responsibility and will not be liable for any damages suffered as a result of using, modifying, copying, distributing or referencing these materials.**

## **Reference Guide Swimming Pool/Spa**

### **Pool/spa cover**

Spas and heated pools must have covers (except solar heated). Gas spas and pool heaters must have minimum thermal efficiency of 78%.

Evaporation is the greatest source of heat and chemical loss. Pool covers reduce evaporation and pool heating cost, reduce chemical consumption, reduce cleaning time by keeping dirt and other debris out, and conserve water by reducing the amount of makeup water. Transparent covers allow for solar gain where opaque covers are best to prevent heat loss during the nighttime.

Using an insulated spa cover retains spa heat. Covering the spa when not in use is a very inexpensive way to reduce heat loss from the water to the ambient air, since the majority of the heat lost from a spa is in the upward direction. It also blocks evaporation, which saves water and chemicals. In turn, this reduces the need to dehumidify the air, saving on ventilation and air heating. The spa's hot water temperature makes savings from a cover particularly attractive.

### **Solar pool heating system**

According to Florida Green Building Coalition (FGBC)<sup>1</sup>, "The average yearly cost for heating a residential pool in Florida is approximately \$1450 using electrical resistance and often over \$500 using an electric heat pump or using natural gas. Liquid propane costs about the same as electrical resistance. A solar pool heating system is appropriate in Florida and can pay for itself in as little as two years."

### **Efficient pool/spa pump**

Pool pumps with two-speed motors have the potential to provide significant energy savings; low speed is adequate for filtration, while high speed is used for heating, vacuuming, operating the skimmers, and filter backwash. Two speed pumps typically have a high speed of 3,450 rpm and a low speed of 1,725 rpm. Although motor efficiency falls at low speed, overall efficiency is much higher due to the reduced pressure drop incurred.

Spas use one or more pumps to fulfill two functions: powering jets and circulating water. Jets, those nozzles that shoot out the massaging bubbles, require the pumping power of one or more one-to three-hp motors. This high pumping power is only required when the spa is occupied and the occupants turn the jets

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<sup>1</sup> FGBC is a nonprofit Florida Corporation dedicated to improving the built environment. Its mission statement is "to provide a statewide Green Building program with environmental and economic benefits."

on. The circulation function requires much less pumping power (typically 1/8 hp or less) for much longer run times.

The primary efficiency opportunities for spa pumping are the separation and control of the jet and circulation functions. Older spas and hot tubs often use a single pump for both the jet and circulation functions. Most electrically heated spas come with a two-speed pump; the lower speed provides circulation, and uses less energy than single-speed pumps. The most efficient option is to use two separate pumps. A separate circulation pump can be considerably more efficient than the low speed of a two-speed pump.

Though small motor efficiency is hard to gauge (due to lack of efficiency measurement and reporting); a comparison of full-load amps illustrates the magnitude of the efficiency difference. A typical two-speed pump has a full-load current rating of 2.8 amps at low speed. In comparison, a separate circulation motor has a rating of 0.58 amps. Some of the savings may be offset if the stand-alone circulation pump runs continuously.

## **Building Envelope**

### **Insulation**

#### **Ceilings**

- Should be insulated if they are above heated and cooled areas of your home
- Use loose fill, batt or foam insulation
- Minimum R-value: Under attic - R-30.

#### **Walls**

- Insulate all exterior walls, including walls adjoining the garage or other unconditioned areas
- Minimum R-value:  
Exterior & adjacent masonry walls: R-5  
Common masonry walls: R-3 each side  
Wood frame: Exterior, adjacent & common wood frame: R-11

#### **Floors**

- Insulate the underside of all raised floors that separate the inside conditioned areas from the outside (unconditioned areas)
- Minimum R-value:  
Slab on grade: R-0  
Raised wood: R-19  
Raised concrete: R-7

### **Windows**

The Efficient Window Collaborative (EWC)<sup>2</sup> recommends the following technical features for the Florida climate (mostly cooling):

- Select skylights with a Solar Heat Gain Coefficient (SHGC) of 0.40 or less
- Select windows with a high Visible-Light Transmittance (VIT), greater than .70, to maximize daylight and view
- Select windows with an Air Leakage rating (AL) of 0.30 or less

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<sup>2</sup> The EWC is a coalition of window, door, skylight and component manufacturers, research organizations, federal, state and local government agencies and others interested in expanding the market for high efficiency fenestration products.

## Mechanical

### **A Class 1 Energy Rating is required**

According to Florida Solar Energy Center (FSEC)<sup>3</sup>, "In Florida, a building's energy efficiency can only be determined using Florida's Building Energy Efficiency Rating System. Because of the **Florida Building Energy Efficiency Ratings Act**, this is a matter of law in Florida. The intent of the Act is to create a "yardstick" that serves to "level the playing field" so that the marketplace will have the requisite understanding and confidence to assign economic value to the result of a Rating."

### **Equivalent to or an ENERGY STAR® central air conditioner:**

Rated below 65,000 Btuh powered by single-phase current and excludes such equipment as window or packaged terminal air conditioners.

Minimum: SEER  $\geq$  12

A manufacturer's limited warranty of 5 years for the compressor and 1 year for parts minimum.

### **Manual J<sup>4</sup> Calculations:**

A calculation performed to determine the heating and cooling load. The calculation includes characteristics such as regional weather data; building-framing materials, building insulation levels, building air infiltration levels and window area. The calculation follows procedures developed by the Air Conditioning Contractors of America (ACCA).

### **"Refrigerant gas" pipeline well insulated**

The larger refrigerant pipe between the outside compressor and wall should be completely insulated.

### **No blockage around condenser coils:**

Keep plants trimmed back a few feet to let air circulate and cool the condenser. Avoid placing anything on or next to the unit that will interfere with its air circulation. Also keep the outside coils of the unit free of grass clippings, leaves, dust and other debris.

### **Equivalent to or ENERGY STAR heat pumps:**

Air source heat pumps (ASHP) that are rated below 65,000 Btuh and powered by single-phase current and excludes such equipment as window and packaged terminal heat pumps. The ASHP may be a single packaged system, where there is only one assembly or a split system where there are two.

SEER  $\geq$  12, HSPF  $\geq$  7.6

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<sup>3</sup> An institute of the University of Central Florida, FSEC functions as the state's energy research, training and certification center.

<sup>4</sup> Manual J is a book of load estimating procedures used to calculate heating and cooling loads.

A manufacturer's limited warranty of 5 years for the compressor and 1 year for parts minimum.

**Cross ventilation or ceiling fans:**

Ceiling fans improve interior comfort by circulating cold & warm air. They can be adjusted to either draw warm air upward during summer months or push it downward during the winter. Ceiling fans installed in each bedroom and each living area where occupants spend the majority of their time can claim the ceiling fan measurement. Ceiling fans must be supported adequately between ceiling joists.

Credit for cross ventilation is counted as a measure *only* if the primary living area and main bedroom have a window on opposite or adjacent walls.

**Water heater efficiency meeting National Appliance Efficiency Standards (NAES) for gas or electric:**

*Water heater efficiency is described by the "Energy Factor" (EF) rating. NAES establishes minimum EF for water heaters as a function of fuel type and size of storage tank with larger tanks having lower efficiencies due to greater standby losses. The EF takes into account the overall efficiency at which the "fuel" (gas, electricity or oil) is converted to useful water heating energy, as well as the standby losses, the loss of energy from the warm tank to the surrounding space.*

***For common size tanks and based on the use of 64 gallons of hot water per day, minimum National Appliance Efficiency Standards are:***

<b>Tank Size</b>	<b>Gas</b>	<b>Electric</b>
<b>30 gallons</b>	<b>.56</b>	<b>.91</b>
<b>40 gallons</b>	<b>.54</b>	<b>.90</b>
<b>50 gallons</b>	<b>.53</b>	<b>.88</b>
<b>60 gallons</b>	<b>.51</b>	<b>.87</b>

**Active solar system**

Active Solar Systems must be closed-loop type.

**Passive solar system**

*Passive Solar Systems must be double-glazed integrated collector storage type.*

### **Light colored roof**

Dark roofing materials absorb heat making the house warmer in the summer months, whereas light colored roofing reflects heat away from the building. For pitched roof buildings, use light colored roofing. For flat roofs, the black asphalt or roofing material should be coated with light colored gravel or painted with light colored or reflective paint.

### **All hot water pipes insulated**

Insulating water pipes of electric water heaters in unconditioned space reduces heat loss or gain in the pipes while the water is standing. An easy and effective way to insulate water pipes is to use foam pipe insulation. At a minimum, insulate both hot and cold pipes directly connected to the water heater to the point of entering the wall. Do not insulate or block the action of the pressure relief valve and pipe. Do not insulate rusty or corroded pipes, replace them first.

### **Mastic or duct tape on all duct joints**

Leaks in the joints between ductwork allow conditioned air to escape into attics. Mastic maintains the seal for decades. Install mastic at every metal duct joint and around the bends in elbows. It is important for all ducts to be sealed. Leaky air ducts can cause negative pressure in the house, which can allow carbon monoxide from gas water heaters and furnaces into the home. Well-sealed ductwork also keeps the house more comfortable.

Duct tape loses its effectiveness in three to five years. However, if duct tape is used, only Pressure Sensitive foil tape, UL181AP, or Heat Sensitive, UL181AH, is acceptable with the scrim pattern visible through the tape. Install duct tape at every duct joint and around the bends and elbows.

## **Appliances, Lights**

### **Equivalent to or ENERGY STAR refrigerator**

Refrigerators and freezers are among the largest consumption users of electricity in most homes. They can account for up to 25% of household energy use. New appliances are much more energy efficient. Use an ENERGY STAR rated or equivalent refrigerator when replacing old units. New, efficient refrigerators can save over 10% of the total annual electric bill.

### **Energy efficient clothes dryer**

In terms of energy use, gas dryers are less expensive to operate than electric ones. However, energy features found on electric dryers that would count toward appliance credit are automatic shut off control or moisture sensors.

### **Equivalent to or ENERGY STAR dishwasher**

New model dishwashers use water and energy more efficiently. Select an ENERGY STAR or equivalent when replacing an older model. Water efficient dishwashers are also energy efficient because most energy consumed by dishwashers is used to heat water. These dishwashers are at least 30% more efficient than 1994 standard washers. Minimum Energy Factor of .58 (25% above the current NAECA criteria; rounded to next EF)

### **Water heater set at 120°F minimum, 140°F maximum**

A temperature of only 120°F is hot enough for most household purposes, such as showering and doing laundry. It is not quite hot enough for use in a dishwasher, but most dishwashers have separate heaters to boost their water temperature up to its required level. If the dishwasher does not have a heater, up to 140°F is recommended.

### **Kitchen lights are fluorescent**

Tube lighting reduces energy use by 50 to 70% compared to incandescent lighting. Light quality is very close to that of incandescent bulbs and there is no longer the flickering hum typically associated with fluorescent lighting. Because the kitchen is one of the high use areas, fluorescent lighting is recommended.

### **Recessed, sealed IC fixtures**

“IC” means that the housings for recessed lights are rated for contact with insulation. Some of these still have “holes” in the housings; so, sealed means that there are no holes or penetrations. Space between these housings and adjacent drywall should also be caulked to prevent additional airflow. If there is room for insulation above and around the housing, there should be no compromise to insulating value.

### **Single bulb fixtures in bathrooms**

Lighting fixtures that contain more than one incandescent bulb can add excessive heat. Accordingly, the light fixture must be designed to use only one bulb with only one light per switch.

### **Outdoor lights are fluorescent/electronic ballast, photocell or have motion detector**

Outdoor lighting is desirable from a security and safety standpoint. However, the time these lights are on can extend well beyond their actual use or need. Motion detectors can save energy by turning lights on only when they are needed. Solar power lights that charge during the day are also an option for satisfying outdoor lighting needs in an energy efficient manner.

### **Refrigerator coils clean**

Dusty condenser coils can increase the energy use of a refrigerator by 20% or more. Coils can be cleaned with the nozzle attachment of a vacuum cleaner, a refrigerator coil cleaning brush or a damp cloth.

### **Refrigerator seals in good condition**

Test the door seals by placing a piece of paper or a dollar bill so it is half in and half out of the refrigerator. If you can pull the paper or bill out easily, the latch may need adjustment, the unit may need to be leveled, or the seal may need replacing.

## **Water (Indoors)**

### **Low flow fixtures**

Federal law requires that faucet and showerheads have flow rates no greater than 2.5 gallons per minute (gpm). Low flow showerheads are the most important faucet type because of the high water use in the household. Flow reducers fit into the aerator at the tip of the faucet and reduce the rate of water flow through the faucet. Low flow showerheads replace standard showerheads. Use flow reducers on all faucets and showers that accept reducers. Old fixtures may not accept reducers if they do not have screw-on aerators. Flow reducers can cut water usage of faucets & showers by as much as 40% with little noticeable effect.

### **Faucet Aerators**

Aerators can reduce the water flow from a faucet to 2 gpm or less compared to 4 gallons per minute or more for older faucets. Aerators are inexpensive parts available from hardware stores and are easily screwed onto an existing faucet opening.

### **Low flow toilets**

New toilets use 1.6 gallons per flush compared with old toilets that require five to seven gallons per flush. Whenever possible, replace existing toilets with new 1.6 gallon models. It is estimated that low flow toilets alone can save up to 22,000 gallons of water per year for a family of four.

### **No leaks at kitchen or bathroom faucets**

Water leaks not only cost energy dollars, they also waste water. Most faucet leaks are due to worn out washers or seals.

## **Water (Outdoors)**

### **Rain shut-off device on irrigation system**

(See “automatic timers on irrigation system”).

### **Irrigation zones for turf/plants/drought tolerant plants**

Native plants survive in certain areas because they are suited to a particular environment without additional nutrients, fertilizers or water. Replacing turf grass with native plants and grasses or wildflowers not only reduces required maintenance and chemical applications but also can reduce the amount of water usage.

### **Automatic timers on irrigation system**

Programmable switches, timers and rain sensors can all improve the efficiency of the irrigation system. Automated irrigation systems that are not in some way responsive to watering needs can actually result in higher than average water use.

### **Rainwater catchment**

For watering purposes, a rainwater catchment system can be as simple as roof gutters with downspouts directed into catchment barrels. Whatever is used must not be drained to a stormwater system or creek; it must either be reused on the lawn or drained into a retention basin.

### **Drip irrigation**

Drip irrigation systems provide a small but constant water supply to landscape; preserving soil moisture & reducing water waste from overspray. Replace standard sprinkler systems with drip irrigation systems for all landscape applications except turf. Drip irrigation systems reduce landscape water use & lower water costs.

## Health

### **Detached garage, carport, or no garage**

A garage that does not have a common wall with living space can eliminate one of the larger potential sources of indoor air pollution, auto exhaust fumes.

### **Low/no VOC paints, solvents, adhesives**

Most paint releases volatile organic compounds (VOC), a major indoor air pollutant, into the home. Low/no VOC products are manufactured without mercury or mercury compounds, or pigments of lead, cadmium, chromium, or their oxides. Most major companies manufacture paint with low/no VOCs, in every finish and in most colors. These paints are applied like traditional paint products. Low/no-VOC paint reduces the emissions of VOCs into the home, improving indoor air quality.

Use solvent-free products in place of standard adhesives for all interior applications such as installation of flooring, countertops, wall coverings, paneling and tub/shower enclosures.

### **Formaldehyde free/sealed particle board**

Particleboard is made from wood fibers and an adhesive that contains urea formaldehyde, a suspected human carcinogen. The formaldehyde is continuously released, referred to as "off gassing" for years after installation, which contributes to poor indoor air quality. Whenever possible, eliminate new particleboard inside by using solid wood for stair treads, certified exterior grade plywood or formaldehyde-free medium density fiberboard (MDF) for shelving, cabinets and countertops.

### **Central vacuum system**

Traditional, portable vacuum cleaners can contribute to poor indoor air quality by simply stirring up and redistributing smaller particles that make it through the vacuum cleaner's filtration system. Central vacuum systems that exhaust to the outside eliminate these agents.

### **Exhaust fan in bathrooms**

Bathroom exhaust fans vented to the outdoors control moisture accumulation (moisture is a critical element of mold and mildew growth).

### **Exhaust fan in kitchen**

Kitchen hood fans vented to the outdoors, improves indoor air quality by preventing overheating, excess moisture buildup and overheating. Steam, gas, smoke and other combustion by-products can result from cooking. Stovetop range hoods expel these by-products to the outside. They are particularly important for gas stoves and can be installed where stoves are adjacent to exterior walls.

**Pleated filters, clean**

Pleated 1-inch filters are a little bit more expensive than standard 1-inch filters. Standard filters are generally less than \$2 and 1 inch pleated less than \$4, but pleated filters last up to twice as long.