Florida Department of Community Affairs
Building Codes and Standards

Proposed Code Modifications Detail

Code Change Cycle: 2010 Triennial Original Modification 3/1/2010 - 4/2/2010

TAC: Energy

Sub Code: Energy Conservation

EN4078 1

Date Proposal Submitted	4/1/2010	**Section**	403.9
Chapter	4	**TAC Recommendation**	Pending Review
Affects HVHZ	No	**Commission Action**	Pending Review
Proponent	Jennifer Hatfield	**General Comments**	No
Attachments	Yes	**Alternate Language**	No

Related Modifications

Summary of Modification

This proposal adds Florida specific energy efficiency language for pool heaters, residential filtration pumps and motors, and portable spas per the legislative directive in the 2008 energy bill (HB 7135). It also makes necessary clarifications under the cover section.

Text of Modification

Note - Changes in Red are changes to what is in the current FL Energy Conservation Code draft language. The rest of the changes were part of the oneline draft FECC document.

403.9 Pools (Mandatory). Pools shall be provided with energy-conserving measures in accordance with Sections 403.9.1 through 403.9.~~53,~~ and compliance criteria found in Appendix D—Florida Standards, Florida Standard No. 2 (FL-2), Florida regulatory requirements for energy efficiency for residential inground swimming pools and spas, and Florida Standard No. 3 (FL-3), Florida regulatory requirements for portable spa energy efficiency.

403.9.1 Pool and spa heaters. All pool heaters shall be equipped with a readily *accessible* on-off switch that is mounted outside the heater to allow shutting off the heater without adjusting the thermostat setting.

403.9.1.1 Gas and oil-fired pool and spa heaters. All gas- and oil-fired pool and spa heaters shall have a minimum thermal efficiency of 78 percent when tested in accordance with ANSI Z 21.56. Pool heaters fired by natural gas shall not have continuously burning pilot lights.

403.9.1.2 Heat pump pool heaters. Heat pump pool heaters shall have a minimum COP of 4.0 when tested in accordance with ARI 1160, Table 2, Standard Rating Conditions-Low Air Temperature. A test report from an independent laboratories is required to verify procedure compliance.

~~**403.9.1.3 Portable spa standby power**. Portable electric spa standby power shall not be greater than 5(V2/3) watts where V = the total volume, in gallons, when spas are measured in accordance with the spa industry test protocol.~~

403.9.2 Time switches. Time switches shall be installed on swimming pool heaters and pumps that can automatically turn ~~off and on~~ the heaters and pumps off and on according to a preset schedule ~~shall be installed on swimming pool heaters and pumps~~.

Exceptions:

1. Where public health standards require 24-hour pump operation.
2. Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

403.9.3 ~~Pool c~~Covers. Heated swimming pools and spas shall be equipped with a vapor-retardant pool cover on or at the water surface or a liquid cover or other means proven to reduce heat loss. ~~Pools heated to more than 90°F (32°C)~~ Portable spas shall have a ~~pool~~ cover with a minimum insulation value of R-12.

Exception: Outdoor p~~P~~ools deriving over 70 ~~60~~ percent of the energy for heating from site-recovered energy, such as a heat pump or solar energy source, computed over an operating season.

403.9.4 ~~Pool design.~~ Residential pool pumps and pump motors. Pool filtration pump motors shall meet the following requirements, along with the compliance criteria provided for in FL-2, Appendix D:

403.9.4.1 Pool pump motors. Pool pump motors shall meet the following criteria:

1. Pool pump motors shall not be split-phase, shaded-pole or capacitor start-induction run types.
2. Pool pumps and pool pump motors with a total horsepower (HP) of = 1 HP shall have the capability of operating at two or more speeds. The low speed shall have a rotation rate of no more than ½ of the motor's maximum rotation rate.
3. Pool pumps motor controls shall have the capability of operating the pool pump at a minimum of two speeds. The default circulation speed shall be the residential filtration speed, with a higher speed override capability for a temporary period not to exceed one normal cycle or ~~120 minutes~~ 24 hours, whichever is less.

Exception: Solar pool heating systems shall be permitted to run at higher speeds during periods of usable solar heat gain.

403.9.5 Portable spa standby power. Portable electric spa standby power shall not be greater than 5(V2/3) watts where V = the total volume, in gallons, when spas are measured in accordance with the spa industry test protocol provided in FL-3, Appendix D.

Proposed Code Modifications Detail

Rationale

In 2008 the legislature deemed that in order to consume less energy, certain aspects of the pool & spa filtration and heating system design and equipment are to follow certain guidelines set out in this proposal and in the Appendix D referenced material. The clarifications made under the cover section are needed to prevent misinterpretation of vague and sometimes unenforceable terms and requirements. The pump motor default circulation speed is changed to conform to current legislation.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

The AHJ will need to verify that the products being installed meet these new energy efficiency requirements. The clarifications to the cover requirements will provide clearer direction then what currently exists.

Impact to building and property owners relative to cost of compliance with code

These energy efficient products may increase the cost of the product to the owner upfront; however, a savings will ultimately occur with the owner's utility bill that should offset the increase associated with purchasing the product.

Impact to industry relative to the cost of compliance with code

The legislatively mandated products may cost more to purchase. There are no pool covers that meet the R-12 insulation value; only applicable to portable spas. If not clarified, it will amount to an unattainable mandate that will cost industry time and dollars having to address it with every AHJ.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

These energy efficient pool/spa products will lower the energy consumption of a pool/spa, benefiting the general public. If the cover requirement is not removed or amended the safety of the consumer will be at risk.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal strengthens and improves the code by requiring products, methods, and systems of construction that will result in energy savings. It also removes and clarifies unattainable requirements that will cause enforcement problems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal provides for a standard and method of compliance for all products to follow. Products not meeting these new requirements will not be allowed to be installed.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code; it actually strengthens and gives consistency throughout the State of Florida by providing guidance on how to meet the new energy efficiency requirements for pools and spas.

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EN4271 2

Date Proposal Submitted	4/1/2010	**Section**	403.9.3
Chapter	4	**TAC Recommendation**	Pending Review
Affects HVHZ	No	**Commission Action**	Pending Review
Proponent	Jennifer Hatfield	**General Comments**	No
Attachments	Yes	**Alternate Language**	No

Related Modifications

Summary of Modification

This proposal removes the cover requirements for pools and spas and clarifies that the R-12 insulation requirement for covers is only required for portable spas (hot tubs). The current requirements are unenforceable and pose serious safety hazards.

Text of Modification

403.9.3 ~~Pool c~~Covers. ~~Heated swimming pools and spas shall be equipped with a vapor retardant pool cover on or at the water surface. Pools heated to more than 90°F (32°C)~~ Portable spas shall have a ~~pool~~ cover with a minimum insulation value of R-12.

~~Exception: Outdoor pPools deriving over 70 60 percent of the energy for heating from site-recovered energy or solar energy source computed over an operating season.~~

Rationale

This proposal removes the cover requirements for pools and spas and clarifies that the R-12 insulation requirement for covers is only required for portable spas (hot tubs). Only portable spa cover manufacturers make covers that are R-12 or greater; there is no product available for pools or nonportable spas. The current requirements are also unenforceable and pose serious safety hazards. See attached support file for more information.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

This eliminates the requirement the AHJ enforce a provision that is unenforceable to maintain and that can cause serious safety hazards. Further, no product exists for pools and nonportable spas that would require the R-12 insulated cover under the current language.

Impact to building and property owners relative to cost of compliance with code

This proposal decreases the cost to building and property owners by removing a requirement that would be costly and not necessarily result in savings, rather it would become a nuisance and safety hazard.

Impact to industry relative to the cost of compliance with code

This proposal clarifies the R-12 value is only applicable to portable spas, there are no pool covers that meet the R-12 insulation value. Requiring covers may also discourage customers from purchasing a pool or spa, negatively affecting the industry if this proposal is not adopted.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

If the cover requirement is not removed, with the exception of portable spas, the safety of the consumer will be at risk. See supportive documentation file for further information.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal strengthens and improves the code by removing unattainable requirements that will cause enforcement problems.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal removes language that would discriminate against certain materials, products, methods, or systems.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code; it actually strengthens and gives consistency throughout the State of Florida by removing unenforcable and vague requirements.

Proposed Code Modifications Detail

EN4072 3

Date Proposal Submitted	4/1/2010	**Section**	Appendix D
Chapter	4	**TAC Recommendation**	Pending Review
Affects HVHZ	No	**Commission Action**	Pending Review
Proponent	Jennifer Hatfield	**General Comments**	No
Attachments	Yes	**Alternate Language**	No

Related Modifications

Summary of Modification

Provides criteria on how to comply with section 403.9 of the FECC; parts of which are legislative directive. This document is the APSP-15 Draft Standard for Energy Efficiency for Residential Inground Swimming Pools & Spas that the FBC Energy Workgroup recommended for adoption into the 2010 code

Text of Modification

APPENDIX D—FLORIDA STANDARDS
FLORIDASTANDARD NO. 2 (FL-2)
FLORIDAREGULATORY REQUIREMENTS FOR ENERGY EFFICIENCY FOR RESIDENTIAL INGROUND SWIMMING POOLS & SPAS

The following regulatory requirements shall constitute Florida Standard FL-2 and will provide compliance criteria for section 403.9 of the *Florida Building Code, Energy Conservation Code.* These requirements follow a draft national standard for energy efficiency for residential in-ground swimming pools and spas.

SECTION 1
SCOPE

1.1. Energy efficiency requirement for permanently installed residential swimming pool filtration and swimming pool and spa heating systems used for bathing and are operated by an owner. This standard is intended to cover certain aspects of the swimming pool filtration and heating system design, equipment, installation, and operation for the purpose of consuming less energy while maintaining water quality and temperature.

1.2. This standard does not cover swimming pool safety requirements, including, but not limited to, suction entrapment, structural, thermal, or electrical hazards.

1.3. This standard provides specifications for energy efficient filtration systems, but does not specify sanitizer, daily turnover flow rates, or pool-cleaning technologies needed to establish and maintain swimming pool water quality.

1.4. This standard provides specifications for energy efficient swimming pool and spa heating systems.

1.5. Other standards are referenced in this standard for items not covered.

SECTION 2
NORMATIVE REFERENCES

AHRI 1160, *Standard For Performance Rating of Heat Pump Pool Heaters*
APSP-4, *Standard For Aboveground/Onground Residential Swimming Pools.**[1]***
APSP-5, *Standard For Residential Inground Swimming Pools.1*
APSP-7, *Standard for Suction Entrapment Avoidance in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Catch Basins.1*
HI 1.6, *Centrifugal Pump Test.**[2]***
IEEE 114-2001, *Standard Test Procedure for Single-Phase Induction Motors.**[3]***
NFPA 70, *National electrical code, Article 680, Swimming pools, fountains, and similar installations*.[4]
NSF 50, *Equipment for Swimming Pools, Spas, Hot Tubs and Other Recreational Water Facilities*.[5]

SECTION 3
DEFINITIONS

Auxiliary Pool Loads. Features, functions, or devices that need higher head and flow rates than that required for pool filtration, including, but not limited to, solar pool heating systems, filter backwashing, pool cleaners, waterfalls, fountains, and spas.
Backwash Valve. A diverter valve designed to reverse the flow of water through a filter. The valve is located between the circulation pump and the filter, including, but not limited to, slide, push-pull, multi-port, and full-flow valves.
Elbow (fittings). Also called ell, el. a plumbing pipe or pipe connection having a right-angled bend.
Filtration Flow Rate**.** A flow rate that will turn over the pool water volume in six hours or more (must be equal to or less than the maximum filtration flow rate).
Flow Rate. Flow rate is the volume of water flowing through the filtration system in a given time, usually measured in gallons per minute (gpm).
Head. The water pressure necessary to move fluid through pipes, and inlets, push water through filters and heaters, and project it through fountains and jets.
Maximum Filtration Flow Rate. The flow rate needed to turn over the pool water volume in six hours or 36 gpm, whichever is greater.
Maximum Flow Rate. The flow rate for the auxiliary pool loads or the filtration flow rate, whichever is greater.

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Multi-Speed. A motor capable of operating at two (2) or more speeds and includes two-speed and variable-speed pumps.
Nameplate Horsepower. The nameplate power is the motor horsepower listed on the nameplate and the horsepower by which a pump is typically sold (also known as rated horsepower).
NSF/ANSI 50 is the NSF International (formerly National Sanitation Foundation) Standard and American National Standards Institute document entitled "Circulation System Components and Related Materials for Swimming Pools, Spas/Hot Tubs"
Pumps. Pool and spa pumps usually come with a leaf strainer before the impeller. The pumps contain an impeller to accelerate the water through the housing. The motors for residential pumps are included in the pump purchase but can be replaced separately. The pumps increase the "head" and "flow" of the water.
Permanently Installed Swimming Pool. A pool constructed in such a manner that it cannot be disassembled for storage.
Pipe and Pipe Fittings. The PVC pipe and fittings intended for use in the transport of swimming pool filtration water. Fittings include elbows, tees, and flow control valves. Pipe and fittings do not include backwash valves, which are addressed separately, and equipment connections, or internal equipment piping.
Rated Horsepower.The motor power output designed by the manufacturer for a rated RPM, voltage and frequency. May be less than Total Horsepower where the Service Factor is > 1.0, or equal to Total Horsepower where the Service Factor = 1.0
Residential Swimming Pools. Permanently installed residential inground swimming pools intended for use by a single-family home for noncommercial purposes and with dimensions as defined in ANSI/NSPI-5.
Return. The return refers to the water in the filtration system returning to the pool. The return lines or return side, relative to the pump, can also be defined as the pressure lines or the pressure side of the pump. Water in the returns is delivered back to the pool at the pool inlets.
Service Factor. A multiplier applied to rated horsepower of a motor to indicate the percent above nameplate horsepower at which a pump motor may operate continuously without exceeding its allowable insulation class temperature limit, provided the other design parameters such a rated voltage, frequency and ambient temperature are within limits. Full-rated pool motor service factors can be as high as 1.65. A 1.5 hp pump with a 1.65 service factor produces 2.475 hp (total horsepower) at the maximum service factor point.
Service Factor Horsepower (SFHP). The maximum continuous duty motor power output rating allowable for nameplate ambient rating and motor insulation class. Commonly, service factor horsepower = rated horsepower x service factor (also known as total horsepower).
Suction. Suction created by the pump is how the pool water gets from the skimmers and suction outlets to the filtration system. The suction side and suction lines refer to the vacuum side of the pump. It is at negative atmospheric pressure relative to the pool surface.
Sweep Elbow. Sweep elbows or a type of elbow that has a pressure drop less than the pressure drop of straight pipe with a length of 30 pipe diameters. For example, a 2 inch elbow must have a pressure drop less than a 5-foot length of 2 inch straight pipe.
Total Dynamic Head. Total dynamic head, or TDH, refers to the sum of all the friction losses and pressure drops in the filtration system from the pools suction outlets and skimmers to the returns. It is a measure of the system's total pressure drop and is given in units of either psi or feet of water column (sometimes referred to as "feet" or "feet of head").
Total Horsepower. The product of the rated horsepower nameplate power and the service factor of a motor used on a pool pump.
Turnover. A turnover is the act of filtering one volume of the pool.
Turnover Time (also called Turnover Rate). The time required to circulate the entire volume of water in the pool or spa through the filter. e.g. A turnover time of 6-hours means an entire volume of water equal to that of the pool will be passed through a filter system in six hours.
Turnover Time = Volume of the pool / Flow rate

SECTION 4
APPLIANCES

4.1 Pool filter pumps

4.1.1 Motors

4.1.1.1 Motor efficiency

Pool filter pump motors shall not be split-phase, shaded-pole, or capacitor start – induction run type.

4.1.1.2 Two-speed, multi-speed, or variable-speed capability

Pool filter pump motors with a capacity of 1 total horsepower or greater shall have the capability of operating at two or more speeds with a low speed having a rotation rate that is no more than one-half of the motor's maximum rotation rate.

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4.1.1.3 Test methods for pool filter pump motors
4.1.1.3.1 Reported motor efficiency shall be verifiable by test method IEEE 114-2001, or most recent version.
NOTE- Section 5.2.4.2.1 of IEEE 114-2001 lists formula for dynamometer correction factor. Formula inadvertently omits a component of the equation. Section 5.2.1.3.2 of the 1982 version of the standard lists formula correctly. Therefore, "corrected" shall mean using the 1982 version of the formula within the 2001 standard.

4.1.2 Pumps

4.1.2.1 Test methods for pool pumps
ANSI/HI 1.6-2000 shall be used for the measurement of pump efficiency.
4.1.2.1.1 Tests shall be conducted using unmodified, manufactured and fully assembled pump, including strainer baskets when applicable.
4.1.2.1.2 Three system curves shall be calculated:
Curve A: H = 0.0167 x F2 (Curve 2.0)
Curve B: H = 0.050 x F2 (Curve 1.5)
Curve C: H = 0.0082 x F2 (Curve 2.5)
Where:
H is the total system head in feet of water.
F is the flow rate in gallons per minute (gpm).
4.1.2.1.3 For each curve (A, B, or C), the pump head shall be adjusted until the flow and head lie on the curve. The following shall be tested and reported:
1. Motor nominal speed (RPM)
2. Flow (gallons per minute)
3. Power (watts)
4. Energy Factor (gallons per watt hour)

Where the Energy Factor (EF) is calculated as:
EF = Flow (gpm) * 60 / Power (watts)
4.1.2.1.4 For two-speed pumps, test and report each curve at both high and low speeds. For variable-speed pumps, test and report highest, lowest, and the best efficiency speed.

4.1.3 Labeling

4.1.3.1 Motors
Each pool filter pump motor shall be marked, permanently and legibly on an accessible and conspicuous place on the unit, in characters no less than ¼", the capacity of the motor.
4.1.3.2 Pumps
Each pool filter pump shall be marked, permanently and legibly on an accessible and conspicuous place on the unit, in characters no less than ¼", the nameplate horsepower of the pump.
4.1.3.3 Two-speed, multi-speed, or variable-speed pool filter pumps shall be marked permanently and legibly on an accessible and conspicuous place on the unit, in characters no less than ¼", "This pump must be installed with a two-, multi-, or variable-speed pump motor controller."

4.2 Pump controllers

4.2.1 Pool pump motor controls for use with a two-speed, multi-speed, or variable-speed pumps shall have the capability of operating the pool pump at least at two speeds. The control's default filtration speed setting shall be no more than one-half of the motor's maximum rotation rate. Any high-speed override capability shall be for a temporary period not to exceed one 24-hour cycle without resetting to default settings.

4.3 Heaters

4.3.1 Energy design

4.3.1.1 Gas-fired pool heaters shall not be equipped with constant burning pilots.
4.3.1.2 All pool heaters shall have a readily accessible on-off switch that is mounted on the outside of the heater and that allows shutting off the heater without adjusting the thermostat setting.
4.3.1.3 Electric resistance hearing is prohibited.

4.3.2 Heater efficiency

4.3.2.1 Gas-fired pool heaters and oil-fired pool heaters shall have a thermal efficiency of not less than 78 percent.
4.3.2.2 There is no energy efficiency standard for electric resistance pool heaters.
4.3.2.3 Electric heat pump pool heaters shall have a coefficient of performance (COP) of not less than 4.0 at the low temperature conditions when tested in accordance with AHRI Standard 1160.

4.3.3 Test methods

4.3.3.1 ANSI Z21.56 – 1994 shall be used for the measurement of gas-fired and oil-fired pool heater efficiency.

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4.3.3.2 ANSI/ASHRAE 146-1998 shall be used for the measurement of electric resistance pool heater efficiency.
4.3.3.3 ARI 1160 - 2008, Table 2, Standard Rating Conditions – Low Air Temperature, shall be used for the measurement of heat pump pool heater efficiency.

ARI 1160 – 2008: Table 2. Standard Rating Conditions

	Air Temperature Surrounding Unit Dry-bulb °F [°C]	Water Temperature Entering Unit Wet-bulb °F [°C]	Water Flow Rate (or Less if Specified by the Manufacturer) °F [°C] GPM L/s
High Air Temperature -Mid Humidity (62% RH)	80.6 [27.0]	70.7 [21.5]	80.0 [26.7] 0.450 per 1000 Btu/h 0.028 per 293.1 Watts
Low Air Temperature -Mid Humidity (63% RH)	50.0 [10.0]	44.2 [6.78]	80.0 [26.7] Same flow rate as established in High Air Temperature - Mid Humidity (62% RH)

To comply with this standard, measured test results for Heating Capacity and Coefficient of Performance shall not be less than 95% of Published Ratings

SECTION 5
POOL SYSTEMS

5.1 General

5.1.1 All filter pumps and filter pump motors installed shall be listed in the California Energy Commission's Appliance Efficiency Database for Residential Pool Pumps, or the APSP Appliance Efficiency Pool Pump Database and shall comply with Section 4.1.
5.1.2 For maximum energy efficiency, pool filtration should be operated at the lowest possible flow rate for a time period that provides sufficient water turnover for clarity and sanitation.
5.1.3 For maximum hydraulic efficiency, sweep elbows or elbow-type fittings that have a pressure drop of less than the pressure drop of straight pipe with a length of 30 pipe diameters are recommended.
5.1.4 Auxiliary pool loads that require high flow rates such as spas, pool cleaners, and water features, should be operated separately from the filtration system to allow the maximum flow rate to be kept to a minimum.
5.1.5 Pool controls are a critical element of energy efficient pool design. Modern pool controls allow for auxiliary loads such as cleaning systems, solar heating, and temporary water features without compromising energy savings.

5.2 Maximum filtration flow rate

5.2.1 Depending on the size (volume) of the pool, the pool filtration flow rate may not be greater than the rate needed to turn over the pool water volume in six hours or 36 gpm, whichever is greater. This means that for pools of

Proposed Code Modifications Detail

less than 13,000 gallons the pump must be sized to have a flow rate of 36 gpm or less and for pools of greater than 13,000 gallons, the pump must be sized using the following equation:
Maximum Filtration Flow Rate (gpm) = Pool Volume (gallons) / 360
5.2.2 These are maximum flow rates. Lower filtration flow rates and longer filtration times are encouraged and will result in added energy savings.
5.2.3 Pools with auxiliary pool loads must use either a multi-speed pump or a separate pump for each auxiliary pool load. For example, if a spa shares the pool filtration system, either a multi-speed pump must be used or a separate pump must be provided to operate the spa. If the pool system can be served by one pump of less than 1 total horsepower in capacity, the pump may be single speed.

5.3 Pool filter pump sizing, flow rate, and filter pump control.

5.3.1 Filtration pump motors with a capacity of 1 total horsepower or more shall be multi-speed.
5.3.2 For pools equal to or less than 17,000 gallons, a filter pump must be chosen such that the flow rate listed for Curve A is less than the maximum filtration flow rate calculated according to Section 5.2.1 (six-hour turnover rate).
5.3.3 For pools greater than 17,000 gallons, a filter pump must be chosen such that the listed flow rate at Curve C is less than the maximum filtration flow rate calculated according to Section 5.2.1 (six-hour turnover rate).
5.3.3.1 The pool filter pump head and flow rate shall be calculated using the following system equation:
H = C X F2
Where:
H is the total system head in feet of water.
F is the maximum filtration flow rate in gallons per minute (gpm).
C is a coefficient based on the volume of the pool:
0.0167 for pools less than or equal to 17,000 gallons.
0.0082 for pools greater than 17,000 gallons.
and;
5.3.4 Filtration pumps shall be sized, or if programmable, shall be programmed, so that the filtration flow rate is not greater than the rate needed to turn over the pool water volume in 6 hours or 36 gpm, whichever is greater; and
5.3.5 Pump motors used for filtration with a capacity of 1 total horsepower or more shall be multi-speed; and
5.3.6 Each auxiliary pool load shall be served by either separate pumps or the system shall be served by a multi-speed pump; and
EXCEPTION: Filter pumps if less than 1 total horsepower may be single speed.
5.3.7 Multi-speed pumps must have controls that default to the filtration flow rate when no auxiliary pool loads are operating. The controls must also default to the filtration flow rate setting within 24 hours and must have a temporary override capability for servicing.
5.3.8 A time switch or similar control mechanism must be installed as part of the pool water filtration control system that will allow all pumps to be set or programmed to run only during the off-peak electric demand period and for the minimum time necessary to maintain the water in the condition required by applicable public health standards.

5.4 System equipment

5.4.1 Filters sizing.
Filters shall be at least the size specified in NSF/ANSI 50 for public pool intended applications based on the maximum flow rate through the filter.
5.4.1.1 The filter factors that must be used are (in ft2/gpm):

Cartridge	0.375
Sand	15
Diatomaceous Earth	2

5.4.2 Backwash valves.
Minimum diameter of backwash valves shall be 2 inches or the diameter of the return pipe, whichever is greater.

5.5 System piping and circulation.

5.5.1 Pool piping and pipe fittings shall be sized so that the velocity of the water at the maximum flow rate does not exceed 8 feet per second in the return line and 6 feet per second in the suction line. Velocity calculations for branch piping flow shall allow variations in pipe sizes.
EXCEPTION: Equipment connections and internal piping, including, but not limited to, suction safety systems, pumps, heaters, and sanitizing devices.

JPG Picture should be here, would not insert, but is in support file document.
Figure 1

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5.5.2 Solar heating. At least 18 inches of horizontal or vertical pipe shall be installed between the filter and the heater or dedicated suction and return lines, or built-in or built-up connections shall be installed to allow for the future addition of solar heating equipment.

5.6 Directional inlets.

The pool shall have directional inlets that adequately mix the pool water.

[1] Association of Pool and Spa Professionals (APSP) [formerly National Spa and Pool Institute (NSPI)], 2111 Eisenhower Avenue, Alexandria, VA 22314

[2]Hydraulic Institute, 6 Campus Drive, First Floor North, Parsippany NJ, 07054-4406, (973) 267-9700, *www.pumps.org*

[3]IEEE Corporate Office, 3 dark Avenue, 17th Floor, New York, NY 10016-5997, (212) 419-7900, *www.ieee.org*

[4]National Fire Protection Association (NFPA) 1 Batterymarch Park, Quincy, MA 02169-7471, (617) 770-3000, *www.nfpa.org*

[5]NSF International, 789 Dixboro Road, Ann Arbor, MI 48113-0140, (734) 769-8010, *www.nsf.org*

Rationale

Proposed FL-2 of Appendix D of the FECC provides the necessary criteria to the manufacturers of pool products, pool contractors, and building departments on what is required to meet the pool heating and residential pool filtration pump requirements found in section 403.9 of the Florida Building Code, Energy Conservation Code and the 2008 energy bill (HB 7135).

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

It may take extra time for the AHJ to verify the products being installed meet these new energy efficiency requirements.

Impact to building and property owners relative to cost of compliance with code

These energy efficient products may increase the cost of the product to the owner upfront; however, a savings will ultimately occur with the owner's utility bill that should offset the increase associated with purchasing the product.

Impact to industry relative to the cost of compliance with code

These products may cost more to purchase; therefore, if the contractor does not pass on this increase in cost to the consumer then their profit margin will lessen.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

These energy efficient pool/spa products will lower the energy consumption of a pool/spa, benefiting the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal strengthens and improves the code by requiring products, methods, and systems of construction that will result in energy savings.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal provides for a standard and method of compliance for products to follow. Products not meeting these new requirements will not be allowed to be installed.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code; it actually strengthens and gives consistency throughout the State of Florida by providing guidance on how to meet the new energy efficiency requirements for pools and spas.

Proposed Code Modifications Detail

EN4077 4

Date Proposal Submitted	4/1/2010	**Section**	Appendix D
Chapter	4	**TAC Recommendation**	Pending Review
Affects HVHZ	No	**Commission Action**	Pending Review
Proponent	Jennifer Hatfield	**General Comments**	No
Attachments	Yes	**Alternate Language**	No

Related Modifications

Summary of Modification

Provides criteria on how to comply w/ s. 403.9.5 of the FECC; the mandatory requirement for portable spas, per legislative directive. This document is the APSP-14 draft Standard for Portable Spa Energy Efficiency that provides the test protocol manufacturers must use when determining standby power.

Text of Modification

APPENDIX D—FLORIDA STANDARDS
FLORIDASTANDARD NO. 3 (FL-3)
FLORIDAREGULATORY REQUIREMENTS FOR PORTABLE SPA ENERGY EFFICIENCY

The following regulatory requirements shall constitute Florida Standard FL-3 and provide compliance criteria for section 403.9.5 of the *Florida Building Code, Energy Conservation Code.* These requirements follow a draft national standard for portable spa energy efficiency.

Section 1. Scope

1.1 These requirements apply to factory built residential portable spas that are used for bathing and are operated by an owner.

1.2 This standard is meant to establish minimum energy efficiency requirements for spas. This standard shall be met notwithstanding certain variations in equipment, materials, and design (Refer to ANSI/NSPI-6).

1.3 These requirements do not apply to public spas, permanently installed residential spas or other spas, such as those operated for medical treatment, physical therapy or other purposes. Swim-spas and portions of combination spas/swim-spas are included in this standard.

1.4 Other standards are referenced in this standard for items not covered.

Section 2. Normative reference

APSP-6 Standard for Portable Spas1

Section 3. Definitions

AMBIENT TEMPERATURE – Air temperature inside testing chamber.

ANCILLARY EQUIPMENT – Additional components used in the construction of the spa beyond pumps, heaters and control systems.

CHAMBER – Climate controlled test room.

ENERGY EFFICIENCY – Using less energy to provide the same level of energy service.

FILL VOLUME - The halfway point between the bottom of the skimmer opening and the top of the spa. If there is no wall skimmer, the spa shall be filled with water to six inches below the top of the spa.

FILTER CYCLE - The period when the control system activates a pump intended to move water through a filter media.

GALLON – Means U.S. liquid gallon

HEATING CYCLE – The period when the temperature regulating system activates the heating component for the purpose of increasing the water temperature.

HOT TUB – See Spa

INGROUND SPA - Non-portable, non-self-contained spa (Refer to ANSI -3 Permanent Inground Spas)

NORMALIZE – Calculation of power consumption to eliminate temperature bias.

NRTL – Nationally Recognized Test Laboratory

POWER FACTOR – The ratio of watts to volt-amperes of an AC circuit.

PURGE CYCLE - The period when the control system activates a pump intended to rapidly move water throughout the spa.

SKIMMER – A suction opening intended to remove floating debris from the water surface and to be installed where part of the water intake opening is open to atmospheric pressure.

SPA – A product intended for the immersion of persons in heated water circulated in a closed system, and not intended to be drained and filled with each use. A spa usually includes a filter, a heater (electric, solar, or gas), a pump or pumps, and a control, and may also include other equipment, such as lights, blowers, and water sanitizing equipment.

Permanent Residential Spa- A spa in which the water heating and water circulating equipment is not an integral part of the product. The spa shall be intended as a permanent plumbing fixture and shall not be intended to be moved. (Refer to ANSI/NSPI-3 1999 Standard For Permanently Installed Residential Spas.)

Public Spa - Any spa other than a permanent residential spa or residential portable spa which is intended to be used for bathing and is operated by an owner, licensee, concessionaire, regardless of whether a fee is charged for use. (Refer to ANSI/NSPI-2 1999 Standard for Public Spas.)

Residential Portable Spa - Either Self-Contained or Non-Self-Contained (Refer to ANSI/NSPI-6 1999 Standard For Residential Portable Spas.):

Self Contained Spa - A factory built spa in which all control, water heating and water circulating equipment is an integral part of the product. Self-contained spas may be permanently wired or cord connected.

Non-Self-Contained Spa - A factory built spa in which the water heating and circulating equipment is not an integral part of the product. Non-self-contained spas may employ separate components such as an individual filter, pump, heater and controls, or they may employ assembled

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combinations of various components.
STANDARD COVER – The cover that is provided or specified by the spa manufacturer.
STANDBY MODE - All settings at default as shipped by the manufacturer, except water temperature which may be adjusted to meet the test conditions. No manual operations are enabled.
SWIMSPA –Variant of a Residential Portable Spa which consists of a large unobstructed volume of water primarily designed for, and constructed with specific equipment required to produce a water flow intended to allow recreational physical activity including, but not limited to, swimming in place. Swim spas may include peripheral jetted seats intended for water therapy, heater, circulation and filtration system, or may be a separate distinct portion of a combination spa/swim spa with separate controls.
WATT HOUR – Energy consumed over a period of one hour.

Section 4. Test Method

4.1 Purpose: To measure the energy consumption of a portable electric spa in standby mode, using a repeatable and reproducible test procedure. The results will be used to calculate the standby power demand.

4.2 Test Equipment

Note: All equipment shall be calibrated and traceable to the National Institute of Standards and Technology (NIST). The test facility and equipment will be evaluated by a NRTL to confirm they meet the requirements of this standard. Documentation showing facility and test equipment compliance to this standard from the NRTL will be maintained on site by the test facility and made available as required.
4.2.1 Recording Watt Hour meter – Accuracy: Class-2 or better.
4.2.2 Temperature measurement system - Accuracy: +/- 1°F
4.2.3 Water meter to measure fill water in gallons – Accuracy: +/- 1.5%

4.3 Test Conditions

The test method for portable electric spas is as follows:
4.3.1 Minimum continuous testing time shall be 72 hours.
4.3.2 The spa shall be filled with water to the halfway point between the bottom of the skimmer opening and the top of the spa. If there is no wall skimmer, the spa shall be filled with water to six inches below the top of the spa.
4.3.2.1 Measure and record fill volume (V) while filling according to 4.3.2.
4.3.3 The water temperature of the spa or spa portion of a combination swim spa shall be a minimum of 100°F, for the duration of the test. The water temperature of the swim spa or swim portion of a combination swim spa shall be a minimum of 85°F, for the duration of the test.
4.3.4 The ambient air temperature shall be a maximum of 63°F for the duration of the test.
4.3.5 The standard cover that comes with the unit shall be used during the test.

4.4 Test Procedure

4.4.1 The test shall start when the water temperature has been at 102°F, ±2°F, (at 87°F, ± 2°F for swimspas) for at least a four hour stabilizing period.
4.4.2 Record water temperature.
4.4.2.1 The thermocouple shall be located three to five inches below the water level and centrally located relative to the shape of the spa.
4.4.3 Record ambient air temperature at one point located a maximum of one to one and a half feet above spa cover level and six to eight inches from the chamber wall and out of direct airflow from the chamber temperature control system and/or circulation fan.

4.4.4 Data Recording

4.4.4.1 Record temperatures at a maximum interval of 4 minutes.
4.4.4.2 Measure voltage, current, and power factor (OPTIONAL) at a maximum interval of 4 minutes.
4.4.4.3 Record watt-hours, voltage and current used during entire Test Period.
4.4.4.4 Record elapsed time during Test Record.
4.4.5 Record the total energy use for the period of test, starting at the end of the first heating cycle after the stabilization period and finishing at the end of the first heating cycle after 72 hours has elapsed.
Exception: For spas without heaters, substitute heating cycle with filter or purge cycle.
4.4.6 The unit shall remain covered and in the default operation mode during the test. Energy-conserving circulation functions, if present, must not be enabled if not appropriate for continuous, long-term use. The minimum filtration rate shall be 12 water turns within a 24 hour period. Ancillary equipment including, but not limited to lights, audio systems, and water treatment devices, shall remain connected to the mains but may be turned off during the test if their controls are user accessible.

Section 5. Formulas

5.1 The measured standby power (Pmeas) shall be determined by E/t:
Pmeas = E/t
Where:
E = total energy use during the test (Wh)
t = length of test (hr)
5.2 The measured standby power (Pmeas) shall be normalized (Pnorm) to a temperature difference of 37°F using the equation:
Pnorm = Pmeas (Delta Tideal / Delta Tmeas)
Where:
Delta Tideal = 37°F
Delta Tmeas = Twater avg – Tair avg
Twater avg = Average water temperature during test
Tair avg = Average air temperature during test.

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5.3 The normalized standby power (Pnorm) shall not be greater than maximum standby power (Pmax):
Pmax = $5(V^{2/3})$
Where:
V = fill volume in gallons
Section 6. Label Requirements
6.1 The manufacturer shall include either on or in close proximity to the spa's product label the standby watts rating.
6.2 Wording to be in the following format:
Per ANSI-14 Measured Standby Power Consumption XXXX watts/hr
(Maximum Allowable Standby Power Consumption XXXX watts/hr)

APPENDIX A
Minimum Chamber Requirements

Chamber internal dimensions:
Minimum 7 feet high
Minimum 1 foot from spa to chamber wall or other internal barrier.
Air flow: If air circulation from the air temperature control equipment is intermittent, install 1 fan in one corner of the chamber, 6 feet from the floor. Direct toward the center of the floor. The fan should move at least 80 CFM of air, and not more than 100 CFM. If the air temperature control equipment continuously circulates air in the chamber, no fan is required.
Chamber Insulation: Walls shall be insulated adequately to maintain proper ambient temperatures.
Chamber Floor: The floor may be insulated with 2" thick R-13 polisocyanurate with radiant barrier on both sides. This insulation shall be laid directly on a level concrete floor or slab or other firm, level surface created for it. The insulating layer shall be sheeted with minimum 1/2" thick plywood to protect the insulation layer and provide a smooth surface to properly position the spas to be tested.
[1]Association of Pool & Spa Professionals (APSP) (formerly National Spa and Pool Institute (NSPI), 2111 Eisenhower Avenue, Alexandria, VA 22314

Rationale

This proposal provides criteria to the manufacturers of portable spas & contractors who install these products on what is required to meet the standby power requirement in s. 403.9.5 of the FECC & the 2008 energy bill. A permit may be required when installing a portable spa & the criteria includes labeling requirements to assist inspectors. The legislation & s. 403.9.5 references the portable spa test protocol, by adopting FL-3, the test protocol can be easily referenced.

Fiscal Impact Statement

Impact to local entity relative to enforcement of code

It may take extra time for the AHJ to verify the portable spa being installed meets this new energy efficiency requirement.

Impact to building and property owners relative to cost of compliance with code

This energy efficient product may possibly increase the cost of the product to the owner upfront; however, a savings will ultimately occur with the owner's utility bill that should offset any increase associated with purchasing the product.

Impact to industry relative to the cost of compliance with code

This same requirement is in affect in other states and may soon be a federal law; thefefore, the impact to the industry has already occured for those who have complied.

Requirements

Has a reasonable and substantial connection with the health, safety, and welfare of the general public

Portable spas meeting this energy efficient requirement will result in lower energy consumption, benefiting the general public.

Strengthens or improves the code, and provides equivalent or better products, methods, or systems of construction

This proposal strengthens and improves the code by requiring portable spas' standby power not be greater than 5(V2/3) watts where V = the total volume, in gallons, when spas are measured in accordance with the spa industry test protocol provided in FL-3, Appendix D, resulting in energy savings.

Does not discriminate against materials, products, methods, or systems of construction of demonstrated capabilities

This proposal provides for a test procedure for all products to adhere to, products not meeting these new requirements will not be allowed to be installed.

Does not degrade the effectiveness of the code

This proposal does not degrade the effectiveness of the code; it actually strengthens and gives consistency throughout the State of Florida by providing guidance on how to meet the new energy efficiency requirements for portable spas.

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Search Criteria

Modification #:	ALL	**Code Version:**	2010
Code Change Cycle:	2010 Triennial Original Modification 03/01/2010 - 04/02/2010	**Sub Code:**	Energy Conservation
Chapter & Topic:	Chapter 4 - Residential Energy Efficiency	**Section:**	ALL
Date Submitted From:	ALL	**Date Submitted To:**	ALL
TAC:	ALL	**TAC Recommendation:**	ALL
Commission Action:	ALL	**Proponent Last Name:**	Hatfield
Proponent First Name:	Jennifer	**Text of Modification:**	ALL
Related Modifications:	ALL	**Affects HVHZ:**	ALL