

DOCKETED

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| Project Title: | Pool Pumps and Spa Labeling |
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| Document Title: | Draft Portable Electric Spa Standards Staff Workshop Slides |
| Description: | N/A |
| Filer: | Sean Steffensen |
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California Energy Commission

Staff Workshop

Draft Portable Electric Spa Standards

February 18, 2016

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Presentation Agenda

- Workshop Purpose
- Scope and Product Description
- Regulatory Approach
- Technical Feasibility
- Cost Effectiveness
- Statewide Energy Savings
- Environmental Benefits
- Discussion Topics
- Presentations
- Comments



Workshop Purpose

- Staff Proposal:
 - Clarify the scope and definitions of portable electric spas
 - Adopt the ANSI/APSP/ICC-14 (2014) test method
 - Achieve energy savings by increasing the standby power consumption standard
 - Increase energy savings through a labeling requirement
- The draft staff report contains all the proposal details.
http://docketpublic.energy.ca.gov/PublicDocuments/15-AAER-02/TN210066_20160128T103017_Analysis_of_Efficiency_Standards_for_Pool_Pumps_and_Motors_and.pdf
- Staff seeks public comments on the proposal.



Scope



Standard Hard Shell



Flexible/Inflatable Shell



Swim/Exercise/Combination

- Factory-built and free standing electric spas or hot tub units, supplied with equipment capable of heating and circulating the water inside a rigid, flexible, or inflatable shell.

Sources: www.all-seasons-spa-stove.com, intexcorp.com, h2xswimspa.com



Spa Cycle Modes

- Most energy intensive cycle modes:
 - Startup mode
 - Standby mode
- Only standby power mode is regulated



Insulation Benefits

- Insulation minimizes heat loss during operating and idle periods, while a spa cover minimizes heat loss and water loss through evaporation during idle periods.
- Therefore, ensuring that a spa cover is being used and improving the cover and insulation reduces the work of the heater and the pump motor needed to maintain a set temperature during idle periods.



Spa Cover Importance

- A worst-case-scenario result of not using a spa cover while heating the water from 60°F to 102°F during standby operation:

| Portable Electric Spa Size (gallons) | Evaporation Rate (gallons/hour) | Energy Consumption (kWh/year) | Water Lost to Evaporation (gallons/year) | Cost for Heating Water (\$) |
|--------------------------------------|---------------------------------|-------------------------------|--|-----------------------------|
| 450 | 1 | 21,688 | 8,760 | \$1,756 |
| 2,250 | 3 | 65,064 | 26,280 | \$10,534 |

- A more realistic 3-month duty cycle still costs hundreds of dollars
- Spa covers conserve as much heat as possible to reduce heat losses during conduction, convection, radiation, and evaporation



Test Method

- Current test method:
 - California Code of Regulations, section 1604(g)(2)
- Proposed test method:
 - ANSI/APSP/ICC-14 (2014) with the exception of the swim spa standby requirement in Section 6.3.1 of the test method
 - Section 6.3.1 sets a separate standby standard for exercise spas



Standby Power Standard

- Current maximum standard: For all portable electric spas manufactured on or after January 1, 2006, and before **January 1, 2018**:

$$5 \times (\text{Volume}^{2/3})$$

- Proposed maximum standard: For all portable electric spas, including swim spas, manufactured on or after **January 1, 2018**:
 - Within ANSI/APSP/ICC-14 (2014)

$$\boxed{[3.75 \times (\text{Volume}^{2/3})] + 40}$$

Updated for energy savings

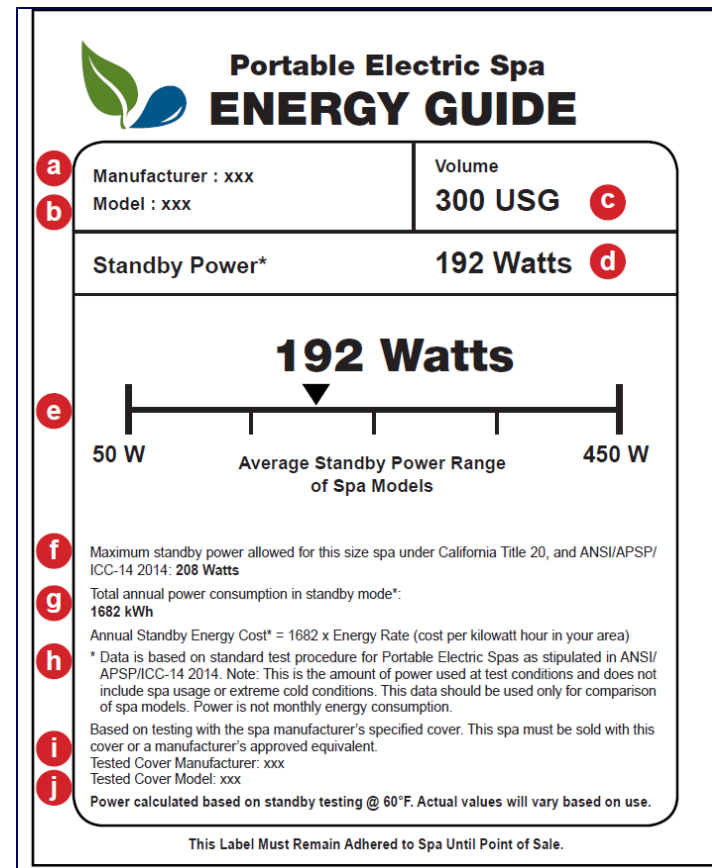
Relief for smaller volume spas



Label Requirement

- Model the label requirement after the label found in ANSI/APSP/ICC-14 (2014)
- The spa shall be marked by the manufacturer with the label per ANSI/APSP/ICC-14 (2014)

ANSI/APSP/ICC-14 (2014)





Label Requirement (Cont.)

The manufacturer shall identify the spa cover model number during certification.

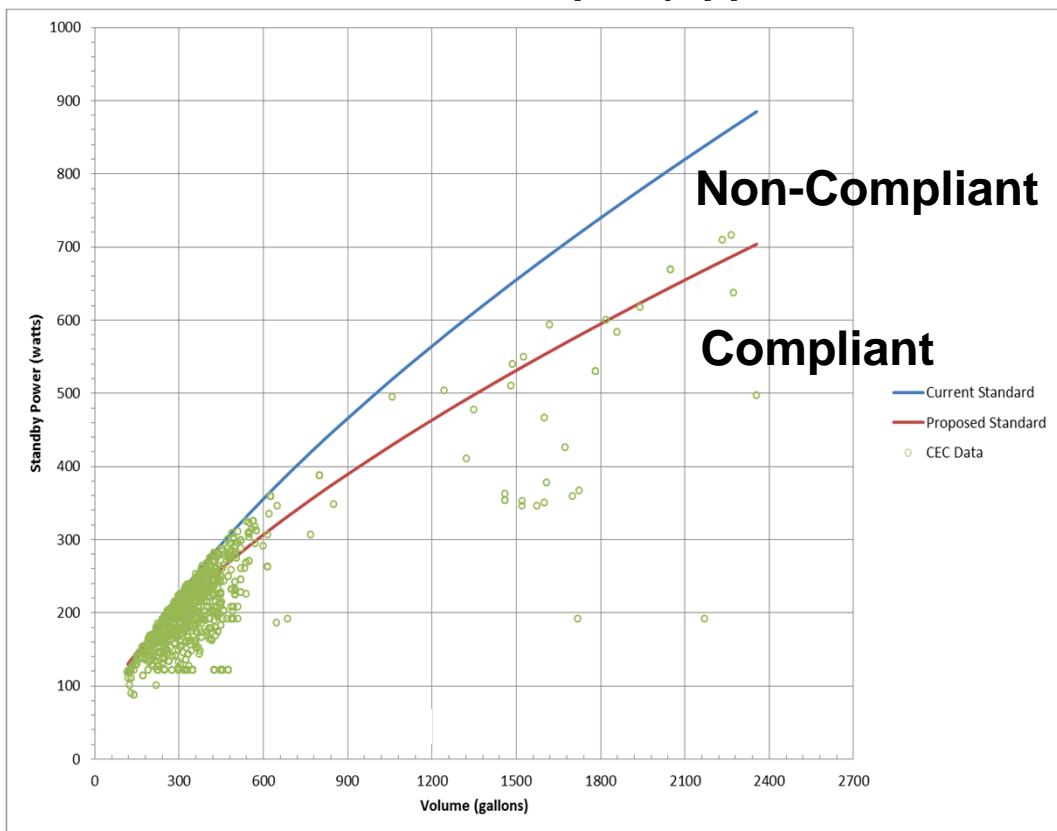
Proposed Changes to Table X, section 1606

| G | Appliance | Required Information | Permissible Answers |
|---|------------------------|-----------------------------------|---------------------|
| | Portable Electric Spas | *Voltage | |
| | | Volume (gallons) | |
| | | Rated Capacity (number of people) | |
| | | Normalized Standby Power (watts) | |
| | | Spa Enclosure is Fully Insulated | Yes, No |
| | | <u>Tested Spa Cover Model</u> | |



Technical Feasibility

Certified Portable Electric Spas (Appliance Database)



| | Volume (gal.) | Compliant (%) | Non-Compliant (%) |
|---------------------|---------------|---------------|-------------------|
| Portable Spas | 0 to 899 | 72.2 | 27.8 |
| Exercise Spas | 900 to 2400 | 69.7 | 30.3 |
| All Certified Units | 0 to 2400 | 72.1 | 27.9 |



Technical Feasibility

- Increase spa standby performance by:
 - Using better shell insulation
 - Including a spa cover with an improved cover design and/or improved insulation materials
- Test method
 - Represents an updated industry standard
 - ANSI/APSP/ICC-14 (2011) effective in Florida on March 15, 2012



Cost Effectiveness

Incremental Costs from Non-compliance to Compliance

| | Incremental Cost to Improve Insulation and/or Cover (\$) | Incremental Cost of Labeling (\$) |
|------------------------|--|-----------------------------------|
| Portable Electric Spas | \$100 | \$0.38 |
| Exercise Spas | \$100 | \$0.38 |

2006 study by Nadel, deLaski, Eldridge, & Kleisch, and 2014 CASE Report

Weighted Unit Energy Savings and Lifecycle Benefits

| | Design Life (years) | Electricity Savings (kWh/year) | Lifecycle Costs (\$/unit) | Lifecycle Benefit (\$/unit) | Lifecycle Benefit/Cost Ratio |
|------------------------|---------------------|--------------------------------|---------------------------|-----------------------------|------------------------------|
| Portable Electric Spas | 10 | 317 | \$ 100.38 | \$ 512 | 5 |
| Exercise Spas | 10 | 1,451 | \$ 100.38 | \$ 2,349 | 23 |



Significant Statewide Energy and Cost Savings

Table A: Standby Power Standard Statewide Annual Stock Savings

| | First-Year Savings | | Complete Turnover Savings | |
|-------|-----------------------------|----------------------|-----------------------------|----------------------|
| | Energy Consumption (GWh/yr) | Savings (Million \$) | Energy Consumption (GWh/yr) | Savings (Million \$) |
| Total | 4.84 | 0.78 | 61 | 10 |

Table B: Statewide Annual Stock Savings Adjusted for Label Impact

| | First-Year Savings | | Complete Turnover Savings | |
|-------|-----------------------------|---------------------|-----------------------------|----------------------|
| | Energy Consumption (GWh/yr) | Savings (Million\$) | Energy Consumption (GWh/yr) | Savings (Million \$) |
| Total | 6.5 | 1.0 | 80 | 13 |

5% impact on total consumption based on improvement to sales-weighted average efficiency using the categorical European Union (UE) Labeling Scheme



Environmental Benefits

| | Annual Avoided Emissions (tons) | | | | | |
|------------------------|---------------------------------------|-----------------------------------|----------------------|---|----------------------|-------------------------------------|
| | Oxides of nitrogen (NO _x) | Sulfur dioxide (SO _x) | Carbon monoxide (CO) | Particulate matter (PM _{2.5}) | Total Air Pollutants | Green house Gas (eCO ₂) |
| Portable Electric Spas | 4.3 | 0.6 | 6.2 | 1.8 | 12.9 | 42,419 |
| Exercise Spas | 0.6 | 0.09 | 0.9 | 0.3 | 1.9 | 6,210 |
| Total | 4.9 | 0.69 | 7.1 | 2.1 | 14.8 | 48,629 |



Discussion Topics

- Spa test covers and whether or not they are included during the sale of the unit
- Modified labeling requirements and how differing labels affect multi-state sales of units
- Are spa covers adequately labeled for the additional certification data field?
- How are inflatable and exercise spas treated under the proposed standard? Should there be an individual standard?



Comments

- Comments due **by 5:00 p.m. on February 29, 2016**
- Submit comments electronically:
 - Go to: <http://www.energy.ca.gov/appliances/2015-AAER-02/rulemaking/>
 - Click on the “Submit eComment” link
- Or send a hard copy to:

California Energy Commission
Dockets Office, MS-4
Re: Docket No. **15-AAER-02**
1516 Ninth Street
Sacramento, CA 95814-5512
- Or send a digital copy to docket@energy.ca.gov, please include docket number **15-AAER-02** and indicate Pool Pump Motors and Portable Electric Spas in the subject line.



Thank You!

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