Proposal Information Template for:
Portable Electric Spa Test Method Revisions

Submitted to:
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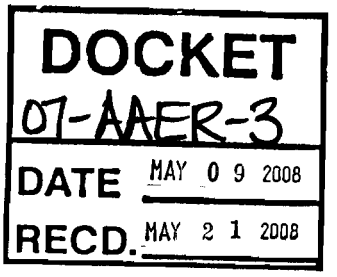
Prepared for:
Pacific Gas and Electric Company

Pat Eilert
Gary Fernstrom
Ed Elliot

Pacific Gas and Electric Company



Prepared by:
Leo Rainer
Davis Energy Group

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2008 Appliance Efficiency Standards
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Davis Energy Group
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CONTENTS

Purpose **2**
Background **2**
Overview **2**
Recommendations **3**
Bibliography and Other Research **4**

Purpose

This document is a report template to be used by researchers who are evaluating proposed changes to the California Energy Commission's (Commission) appliance efficiency regulations (Title 20, Cal. Code Regs,, §§ 1601 – 1608) This report specifically covers revisions to the test method used for the current Portable Electric Spa appliance standards which were adopted by the California Energy Commission on Oct 11, 2006.

Background

Portable Electric Spas were first included in the 2005 Title-20 appliance standards that were adopted at the end of 2005. The 2005 Title-20 standards required testing and listing of portable electric spas and set minimum efficiency levels for portable electric spas effective January 1st, 2006.

Since the implementation of the standards there have been ongoing discussions between PG&E and the spa industry (principally the Association of Pool and Spa Professionals, APSP) in regards to revising the spa test method based on results of industry testing

Overview

PG&E, APSP, and a number of spa manufacturers have been meeting to discuss problems the manufacturers are having complying with the current spa test method. Some manufacturers are finding it difficult or impossible to qualify their smaller spas and question the accuracy of the current test method. To address this, APSP has begun development of an ANSI spa test method based on the CEC test method and, as part of this work, have begun testing a variety of spas at a new test facility at Cal Poly San Luis Obispo.

Two issues are addressed in this template: 1) Spa volume definition; and 2) Clarifications to the test method.

Spa Volume Definition

Under the current regulations the spa volume is included in the data submittal requirements but it is not defined in section 1602. Because it is the primary input to the spa efficiency level (calculated as $5(V^{2/3})$), its value is critical to an unbiased and representative standard. Spa manufacturers generally list the spa volume as part of their specifications, but there is no industry standard as to how it should be measured. Possible options include: (1) the manufacturer's listed volume (generally found on the tub specification label on the tub, in the owner's manual or within advertising of the tub); (2) the maximum fill volume, measured by filling the tub to the point where the entire vessel is full, at the threshold of spilling out of the tub (which would presumably never be achieved in normal use); and (3) the actual or operating fill volume of the spa to which it would be filled under normal use.

Number 1 is the easiest to obtain but the least reliable because there is incentive to exaggerate it both for marketing and compliance purposes (a larger volume results in a less stringent standard level). Number 2 is the easiest to define (fill the tub until it overflows), but the least realistic, because the spa could never be operated or tested in this condition. Number 3 difficult to define, but is the volume at which the spa should be tested and presumed to operate at for most of its life. Two possible ways to define it are:

1. The volume that will fill the spa to the mid point of the skimmer.
2. The maximum fill volume minus 10.6 times the rated capacity (number of people).

Number 1 will not work for spas without skimmers. Number 2 is the volume of water that would be left in the spa if it were filled to the brim and then the rated number of people sat in it. It assumes a body volume of 21.3 gallons/person and that half of the occupants bodies are immersed in the spa. An additional advantage to definition number 2 is that the incentive to increase the spa volume by listing a low rated capacity is offset by the marketing benefit of a high rated capacity.

Test Method Clarifications

The spa test method as defined in the 2005 standards specified a minimum water temperature of 102°F and a maximum air temperature of 60°F during the test. This required that the manufacturer keep the spa well above 102°F and the air temperature well below 60°F for the entire test. Replacing the minimum and maximum temperatures by mean values with a tolerance will provide for more equitable test results and make the test method consistent with other similar methods. The test method also required reporting the cover R-value and relative humidity, both of which add unnecessary complication to the test results. Future refinements to the spa test procedure as developed by APSP and Cal Poly should be incorporated as appropriate.

Recommendations

The following revisions are recommended to clarify the definition of spa volume and the temperatures that must be maintained during the test procedure.

1602 (g)

"Spa volume" means the actual fill volume of the spa under normal use, in gallons.

1604 (g)

(2) Test Method for Portable Electric Spas
The test method for portable electric spas is as follows:

(A) Minimum continuous testing time shall be 72 hours.

(B) The water temperature shall be ~~remain at or above the test temperature of~~ 102 ±2°F for the duration of the test.

(C) The ambient air temperature shall be ~~remain at or below the test temperature of~~ 60 ±3°F for the duration of the test.

(D) The standard cover that comes with the unit shall be used during the test.

(E) The test shall start when the water temperature has been at 102 ±2°F for at least four hours.

(F) Record the total energy use for the period of test, starting at the end of the first heating cycle after the ~~four hour~~ stabilization period specified in Section 1604(g)(2)(E), and finishing at the end of the first heating cycle after 72 hours has elapsed.

(G) 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.

(H) Data reported shall include: spa identification (make, model, S/N, specifications); spa volume ~~of the unit in gallons; cover R-value~~; supply voltage; ~~average relative humidity during test;~~ minimum, maximum, and average water temperatures during test; minimum, maximum, and average ambient air temperatures during test; date of test; length of test (t, in hours); total energy use during the test (P, in Wh); and standby power (P/t, in watts).

1605.3 (g)

(6) **Portable Electric Spas.** The standby power of portable electric spas manufactured on or after January 1, 2006, shall be not greater than $5(V^{2/3})$watts where V = the ~~total~~ spa volume~~, in gallons~~.

Bibliography and Other Research

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