

Improving Water Heater Test Procedure Accuracy

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Improving WH Test Accuracy

- Residential water heater efficiency test procedures require measurement of:
Temperature; Pressure; Mass; Energy; Flow;
Time
- Accuracy of test procedure tied to the precision of the measuring devices.

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- Changes made to Water Heater Efficiency Certification Program to improve the accuracy of tests it conducted.
- Involved both better instruments and technique; still comply with procedures specified by U.S. Department of Energy

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- More Precise Instruments

Measurement	AHRI Program		DOE Test
	Pref.	Min.	
Electricity	.25 %	.25 %	1%
Volts	.5 V	1 V	1%
Amperes	.05 amp	.1 amp	1%
Gas	.5%	1%	1%
Flow	.25%	.5%	1%
Mass	2 lb	.5%	1%

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- Installing Thermocouples in Tank

DOE specifies 6 TCs; one each in the middle of six equal volume nodes; at least 4 inches apart; away from heating element, flue wall, tank sides and anode rod.

AHRI program installs clear tube on drain fitting; affix to side to the top of the unit.

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Put volume of water into tank equal to $(W/12) \pm .5$ lb where “W” is the mass of the water in a full tank.

Mark water level on jacket, use as reference point to determine position of TCs.

Place each TC within $\pm 1/16$ inch of specified position

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- Correlation Tests

(Same Unit tested 3 times)

Type	(Max.-Min.)/ Min.	Std. Dev.
50 G Elec. Old	.43%	.17%
New	.22%	.09%
40 G Gas Old	.36%	.08%
New	.53%	.14%
32G Oil Old	.65%	.17%
New	.62%	.17%

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Questions?

Thank you!