

§ 431.106

10 CFR Ch. II (1–1–12 Edition)

(iii) ASTM Standard Test Method D2156–80, “Method for Smoke Density in Flue Gases from Burning Distillate Fuels.”

§ 431.106 Uniform test method for the measurement of energy efficiency of commercial water heaters and hot water supply boilers (other than commercial heat pump water heaters).

(a) *Scope.* This section covers the test procedures you must follow if, pursu-

ant to EPCA, you are measuring the thermal efficiency or standby loss, or both, of a storage or instantaneous water heater or hot water supply boiler (other than a commercial heat pump water heater).

(b) *Testing and Calculations.* Determine the energy efficiency of each covered product by conducting the test procedure(s), set forth in the two right-most columns of the following table, that apply to the energy efficiency descriptor(s) for that product:

Product	Energy efficiency descriptor	Use test setup, equipment and procedures in subsection labeled “Method of Test” of	With these additional stipulations
Gas-fired Storage and Instantaneous Water Heaters and Hot Water Supply Boilers*.	Thermal Efficiency	ANSI Z21.10.3–1998, § 2.9**.	A. For all products, the duration of the standby loss test shall be until whichever of the following occurs first after you begin to measure the fuel and/or electric consumption: (1) The first cutout after 24 hours or (2) 48 hours, if the water heater is not in the heating mode at that time.
	Standby Loss	ANSI Z21.10.3–1998, § 2.10**.	B. For oil and gas products, the standby loss in Btu per hour must be calculated as follows: $SL \text{ (Btu per hour)} = S \text{ (\% per hour)} \times 8.25 \text{ (Btu/gal-F)} \times \text{Measured Volume (gal)} \times 70 \text{ (degrees F)}$. C. For oil-fired products, apply the following in conducting the thermal efficiency and standby loss tests: (1) Venting Requirements—Connect a vertical length of flue pipe to the flue gas outlet of sufficient height so as to meet the minimum draft specified by the manufacturer. (2) Oil Supply—Adjust the burner rate so that: (a) The hourly Btu input rate lies within ±2 percent of the manufacturer’s specified input rate, (b) the CO ₂ reading shows the value specified by the manufacturer, (c) smoke in the flue does not exceed No. 1 smoke as measured by the procedure in ASTM–D–2156–80, and (d) fuel pump pressure lies within ±10 percent of manufacturer’s specifications.
Oil-fired Storage and Instantaneous Water Heaters and Hot Water Supply Boilers*.	Thermal Efficiency	ANSI Z21.10.3–1998, § 2.9**.	D. For electric products, apply the following in conducting the standby loss test: (1) Assume that the thermal efficiency (Et) of electric water heaters with immersed heating elements is 98 percent. (2) Maintain the electrical supply voltage to within ±5 percent of the center of the voltage range specified on the water heater nameplate.
	Standby Loss	ANSI Z21.10.3–1998, § 2.10**.	(3) If the set up includes multiple adjustable thermostats, set the highest one first to yield a maximum water temperature in the specified range as measured by the topmost tank thermocouple. Then set the lower thermostat(s) to yield a maximum mean tank temperature within the specified range.
Electric Storage and Instantaneous Water Heaters.	Standby Loss	ANSI Z21.10.3–1998, § 2.10**.	

*As to hot water supply boilers with a capacity of less than 10 gallons, these test methods become mandatory on October 21, 2005. Prior to that time, you may use for these products either (1) these test methods if you rate the product for thermal efficiency, or (2) the test methods in subpart E if you rate the product for combustion efficiency as a commercial packaged boiler.

**Incorporated by reference, see § 431.105.