

Comparative Test Protocol for Energy Consumption of an Electric Storage Water Heater

Protocol No.: 0203.2025

Version: 1.1

Date of Test: 02 March 2025

Testing Laboratory: VI-WATT company

1. Test Object

- Device Type: Electric storage water heater, 80 L, 2 kW
- Serial No.: 0123.76

2. Test Basis

- Commission Regulation (EU) No 814/2013 (Ecodesign for water heaters)
- Regulation (EC) No 1275/2008 (Standby & Off-mode)
- EN 50440:2007 (Measurement of energy consumption of storage water heaters)
- EN 62301:2011 (Measurement of standby power)

3. Test Conditions

- Ambient Temperature: 23 ± 2 °C
- Relative Humidity: ≈ 50 %
- Mains Supply: 230 V ± 1 %, 50 Hz
- Initial Water Temperature: 10 °C
- Target Temperature: 60 °C
- Usage Scenario: Two adults; daily shower, hand-washing, cleaning, dishwasher; electric space heaters in use during winter.

4. Test Equipment

Equipment	Purpose	Accreditation
Smart-maic (EC-compliant) Heater energy consumption metering		EN ISO/IEC 17025
Iberdrola billing meters	Whole-apartment energy consumption	Internal quality audit

5. Test Methodology

1. Mode A (without VI-WATT): Heater maintained 60 °C in continuous “keep-warm” mode at 100 % power; consumption recorded via Iberdrola billing for January 2025.
2. Mode B (with VI-WATT): Heater activated before each shower, heated to 60 °C at 40–50 % power via VI-WATT; consumption recorded by Smart-maic for February 2025.
3. Measurement Period: One full calendar month per mode.

6. Test Results

Mode	Period	Energy E (kWh)
A. Without VI-WATT	Jan 2025	364
B. With VI-WATT (40–50 % load)	Feb 2025	299

7. Energy-Saving Calculation

Metric	January (A)	February (B)	Δ (kWh)	Δ (%)
Heater only	214 ¹	50	164	76.6 %
Entire apartment consumption	364	299	65	17.9 %

¹ January heater consumption = 50 kWh (idle “keep-warm” baseline) + 164 kWh (continuous heating to 60 °C)

8. Measurement Uncertainty

- Combined standard uncertainty ($k = 1$): ± 2 %
- Expanded uncertainty ($k = 2$): ± 4 %

9. Conclusion & Recommendations

1. **Key Achievement:** VI-WATT implementation reduced heater energy draw by 76.6 % per heating cycle and lowered total apartment OPEX by 17.9 %.
2. **Action Plan:** Roll out the solution across pilot lines of storage water heaters; integrate Smart-maic data into the BMS for real-time KPI monitoring.
3. **Next Steps:** Conduct ROI analysis; refine VI-WATT control algorithms for seasonality and varied usage scenarios.