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Robust Performance Validation of LENR Energy Generators

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The development of any prototype energy generator based on new physics raises the requirement for rigorous performance testing, particularly in the evolving area of low energy nuclear reactions (LENR). Before such devices can transition into the market place, independent and reliable validations are required. Such validation testing is a prerequisite to the sale of existing or evolved prototypes, acquisition of any rights to intellectual property, or investment in the further development of technology embodied in the existing prototypes. Prospective customers and investors should demand to learn the performance characteristics, and be able to review the results of such rigorous tests.

The primary purpose of this paper is to stimulate discussion on how to perform a test to provide independent validation of a claimed new energy source. The goal is to generate guidelines for how an independent tester can provide sufficient details about the measurement and specifications of device performance, so that the results of the prototype device performance tests can be accepted. Even though the internal details of the early power generators might be proprietary, energy sources offered for sale can and should be accompanied by a detailed test methodology description, independent test results, and adequate performance specifications. Our system and methodology can satisfy the needs for rigorous testing and adequate data.

The initial claimed LENR energy generators are expected to produce excess heat, with later versions producing electricity from heat. Thus, heat measurements with well-calibrated and redundant sensors are required. Many types of calorimeters have already been used for LENR experiments. Of them, mass flow calorimetry seems best adapted to prototype generator performance validation. We developed a water flow system and protocols that can accurately measure the rates of input and output matter and energy flow over extended periods of time, thereby providing energy gain values for devices producing kilowatts of excess heat. Diverse meters and methods were employed to measure the water flow rate. Thermocouples and infrared pyrometers gave the input and output water temperatures. Any electrical or gas inputs should also be measured redundantly. The system is best suited for power measurements between 0.2 to 20 kW, although that range could be extended to higher powers. It was tested with a commercial water heater at the 10 kW level. Additionally, if the source of energy is claimed to be from new physics such as LENR, tests must be conducted for a sufficiently long time to eliminate the possibility of stored chemicals contributing to output energy from the device. Hence, the volume and mass of the device must be known. Controls, calibrations, and stability measurements are also needed. They, and all other aspects of the validation testing, must be thoroughly documented, and any expected safety issues should be disclosed.