

Check List for LENR Validation Experiments

David J. Nagel
The George Washington University
Revised 20 January 2011

Focardi and Rossi demonstrated a novel boiler on 14 January 2011, which converted water at about 13°C to steam at 101°C. The device reportedly produced energy from nuclear reactions between nickel and hydrogen. An electrical heater in the device drew about 1000 W at startup. Later, once the reactions started and provided heat, the input power was reduced to about 400 W. Consumption of hydrogen gas was essentially negligible. The input water flow was about 150 grams each half minute. Given the measured input and output temperatures, that flow rate, and a measurement that the steam was dry, it is easy to compute that the device delivered over 10 kW of thermal energy to the water. The data indicate power and energy gains of more than 10. That amplification is what the International Thermonuclear Experimental Reactor (ITER) seeks to achieve in about a decade for well over \$10B.

The Focardi-Rossi test has not been thoroughly documented yet. However, it is already clear how such performance validation tests should be done in order to fully inform interested people and to withstand criticism. The following is a list of needed actions for validation tests:

1. The tests should be designed, conducted and analyzed so rigorously that they will withstand all anticipated questions and criticisms.
2. Persons experienced in the types of measurements and instrumentation employed should participate in all of the above three phases of the tests.
3. Redundant, well-calibrated sensors and systems will be employed to measure all known streams of energy and matter entering and coming from the device being tested.
4. Signal-to-noise ratios of ten or more are required for all measurements to (a) exclude the possibility of cumulative errors leading to wrong conclusions and (b) insure detection of unexpected new effects.
5. The test should be repeated at least three times, with each conducted for a continuous period of sufficient duration to strongly exclude the possibility of the measured exit energy being from chemicals stored within the device and then releasing energy.
6. A thorough statistical data analysis should be conducted in order to take the error bars associated with each measurement and compute an overall uncertainty in the energy gain.
7. The tests should be fully documented in a report containing all the key aspects of tests, including full calibration data and all raw data, and the report should be publicly available soon after the tests.

8. A red team of persons experienced in related laboratory measurements should be used to critique the design and execution of the tests, and the analysis of the measured results, plus the report containing all relevant details.

Once Focardi and Rossi report the details of what they did and found during the demonstration, their report should be compared with this list of desirable actions above to identify any shortfalls. It is likely, but uncertain, that item #5 was not satisfied during the 14 January 2011 test. Whatever the result of the recommended comparison, additional complete tests of adequate duration should be planned, executed and reported. This assertion should not imply that the demonstration by Focardi and Rossi was entirely unsatisfactory, or that the conclusions based on the demonstration were wrong.