CALORIMETRIC STUDY OF EXCESS HEAT PRODUCTION WITHIN THE HYDROSONIC PUMP SYSTEM USING LIGHT WATER

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ABSTRACT

The Hydrosonic pump is a device that has shown "excess heat" in steady state running conditions continually for a number of years. The basic premise of the pump is that when shock waves are generated in a fluid, a small amount of energy would be given off in the form of heat. The pump has been specifically designed to create millions of controlled shock waves per minute, which in turn generates an acoustical wave in the range of 36K Hertz.

The pump's excess output varies as input parameters are intentionally varied and the phenomenon can be controlled.

In this paper three different experiments will be presented to show the pump in its different stages of production.

1. An experiment where all the input supply water provided to the systems will be converted to a gas (steam).
2. An experiment where the output from the pump is a combination of gas and liquid.
3. An experiment where a liquid state is maintained throughout the entire experiment.

A complete overview of the pump and its related system will be given with a complete description of the experimental procedure. The calorimetry for the experiments will be a combination of computer generated and human data collection and reported in detail.

A BRIEF INTRODUCTION TO THE HYDROSONIC PUMP AND "EXCESS ENERGY" PHENOMENON TESTING

HISTORY OF THE PUMP

The Hydrosonic Pump was invented by Jim Griggs, an electrical engineer, who has specialized in the field of energy conservation. Jim is a member of the Association of Energy Engineers and a member of the National Society of Professional Engineers. He has received numerous awards in the field of energy conservation and has been a consultant to several national companies.

The first production model of the Hydrosonic Pump was completed in 1989. Hydro Dynamics was incorporated in 1990, and the first patent was issued in February of 1993, with a number of U.S. and international patents pending.

OPERATIONAL PRINCIPLES

Although called a "pump", the Hydrosonic pump is not a pump in the conventional sense of the word. While fluid will move through the Hydrosonic Pump unassisted to a minor extent, it requires a conventional circulation pump to achieve satisfactory results in most applications. It is called a pump for marketing reasons. Company management preferred not to associate the Hydrosonic Pump with the negative connotations arising from the term "steam boiler"

The Hydrosonic Pump uses shock waves to generate sufficient energy to produce hot water (fluids) or steam. Physics books state that when water or other liquids flowing in a restriction are suddenly stopped, pressure of approximately 63.4 PSI is created for each foot of extinguished velocity. This pressure wave then travels back up the conduit to the reservoir or other source of the liquid, and cycles are established and repeated. Normally, the waves dissipate in a short period of time. The term used to describe this wave and cycle effect is commonly called "water hammer". It is also stated in textbooks that as the shock waves pass through the liquid, a portion of the energy is converted into heat energy and is dissipated into the mass. The thermodynamic aspects of this effect were considered small and of no significant harm or value. However, this is where the Hydrosonic Pump achieves its objective.

The pump was designed to accomplish a more energy efficient and environmentally safe way of producing hot water and steam. The basic premises of operation are as follow: Water (basically any aqueous solution or fluid) is injected through an opening and is moved across a spinning rotor which is powered by an external source. The rotor is designed as a sphere with numerous cavities drilled in a specific pattern around the surface. This patented design causes several things to occur. There is a shearing stress created as the water first enters the chamber and a small amount of heat energy is created and released into the water. Because the water enters the chamber under a specified amount of pressure, additional heat is generated and absorbed into the water. The shearing stress (dynamic viscosity) increases as the water continues its movement across the rotor to the outlet port. As the water moves across the rotor surface it is being drawn into the numerous dead end openings because of the centrifugal force created by the moving rotor. Millions of shock waves are generated thereby producing heat.

As the shock waves are produced a standing wave effect is established and a resonance is set up within the water. As the rotor continues to spin these waves are intensified and resonances of 25 kilo hertz and higher (frequencies vary with rotor size and design) are produced continuously.

It also appears that tiny air bubbles are formed at some point in the process and the formation and eventual collapse of those bubbles may aid the heat transfer process.

As the heated water leaves the outlet side of the Hydrosonic Pump, it will leave as a combination of steam and condensate, or hot water (liquid). The temperature at which it exits and the state (liquid or gas) in which it exits depends on rotor speeds, hole designs, tolerances between the rotor and housing, water flow rate into the Hydrosonic Pump, and several other design items. An exhaust pressure is also created at this point which can be varied to satisfy the end user's process requirements.

"ENERGY PHENOMENON"

Testing completed to date by both the Company and independent agencies indicates that the Hydrosonic Pump has a significant energy efficiency advantage over conventional boiler(s) or heat transfer processes. Numerous tests conducted by the Company as well as independent third parties continue to reveal an as yet unexplained phenomenon occurring within the patented process relating to energy input and output. Shortly after the Hydrosonic Pump is operational, the "measurable energy" required to operate the Hydrosonic Pump is less than the measured energy output of the Pump. Present during such tests have been representatives from large utility companies as well as independent engineers and consultants. Two of these recent tests will be presented in this paper.

The initial reaction from the "experts" when reviewing these results is almost always the same--impossible! On the surface, these results would seem to violate the second law of thermodynamics; however, the Company believes that because of ultrasonic fields and other unknown forces possibly affecting fluids flowing through the Hydrosonic Pump, it is possible that an energy source is being tapped that has to date not been identified. We at Hydro Dynamics believe that further testing will prove that such an additional source does exist and, most importantly, will identify the source.

TESTING

When the idea for using shock waves to produce heat was conceived, it was thought that such a process might be highly efficient and environmentally clean. The possibility that COP's greater than one could be achieved became apparent immediately, but because this contradicted the laws of thermodynamics the results were viewed with skepticism. However, the phenomenon has continued to persist throughout the years and is still evident in the tests that will be discussed.

It should be noted that these test results on the Hydrosonic System show efficiencies with ratios greater than 1:1. The tests being presented follow a procedure we have recently been requested to use. We perform other tests with different procedures, routinely, in a continuing effort to find the best combination of energy efficiency, reduced capital cost, ease of maintenance, etc., for our market place. We believe that these tests, along with all the others performed for the past three years, may not be representative of the best possible results that can be obtained from the Pump from purely an energy efficiency standpoint.

When Hydro Dynamic Inc. was formed, the working prototypes at that time were bulky and could possibly require considerable maintenance and repairs. It was not unusual to get efficiency ratios of 2:1. It was believed at that time that the Pump should be basically simple to operate and "maintenance free". The housing and bearing configuration was completely redesigned with that concept in mind and, in so doing, reduced the Pump efficiency.

It was thought at this time that the reduced efficiency would not affect the company's specialty marketing effort, which emphasized other features of the Pump. However, because there has been extreme interest in the "energy phenomenon" and the manner in which the Hydrosonic Pump achieves it, the company began production of a pump with a design similar to the original prototype for energy testing purposes only. This pump was completed and testing began in late December 1993.

At this point it has been shown that, with or without the "excess energy" phenomenon, there are numerous applications for the Pump. The Company is continuing its intensified research and development efforts and welcome any suggestions by phone, mail, or personal visits to our operations in Cartersville, Georgia.

FORCED STEAM BARREL TEST 1 and 2

On January 6, 1994 two tests were conducted at the offices of Hydro Dynamics Inc. to determine the efficiency of a Hydrosonic Pump system producing steam. The coefficient of performance (COP) is the basic parameter used to compare the performance of heating systems, and is defined in the Handbook of Energy Engineers, The Fairmont Press, 1989, page 249, as follows:

"COP = RATE OF NET HEAT REMOVAL - divided by -TOTAL ENERGY INPUT"

$$\frac{\text{energy out}}{\text{energy in}}$$

The test was conducted by Jim Griggs, Kelly Hudson, Phillip Griggs and Marvin Dawkins, with the assistance of Jed Rothwell, author and co founder of Cold Fusion Research Advocates, and Dr. Eugene Mallove. Dr. Mallove is the former Chief Science Writer for MIT news office, a noted author holding advanced degrees in astronautical engineering and environmental science, and is presently Editor in Chief of "Cold Fusion" magazine, according to the following procedures:

Before the test begins, a 55 gallon open steel drum weighing 30.5 lbs. empty is placed on a factory weight scale. It is filled with 350 lbs of tap water and temperature and weight are recorded.

Water is fed to the Hydrosonic pump from a 16 gallon feed water tank. A large clear plastic bucket mounted at the top of the tank serves as a hopper. It is marked in two scales: tenth-gallon up to one gallon; and pounds up to 8 lbs. (One U.S. gallon weighs 8.33 lbs.). Care is taken and water is added in 8 lb increments to the hopper making it easy to record the flow and total water added.

Water from the feedwater tank is forced through the Hydrosonic pump by a small auxiliary pump. The flow rate is regulated and displayed with a flowmeter.

The pump is turned on and allowed to reach a steady state of operation with steam being exhausted through a valve to the atmosphere. At the beginning of the test the steam is re-routed into the drum of water through a secondary valve and electrical input power is recorded.

The test was continued for a specific period of time with continual temperature and energy input measurements being recorded.

The results were as follows:

TEST 1

Starting mass and temperature of water in the drum: 350 lbs, 53 degrees F.
Ending mass and temperature in steel drum: 381 lbs, 103 degrees
Water temperature Delta T: 50 degrees F.

Energy added to water: 50 degrees x 381 lbs. = 19050 BTU's = 5.58 KWH
Electrical input power recorded: 4.80 KWH

C.O.P. computation--

	Input KWH	C.O.P.
Apparent	4.80	117%
Adjustment for power factor (apparent-true) and motor efficiency (82.5%)	3.33	168%

TEST 2

Starting mass and temperature of water in steel drum: 350 lbs, 53 degrees F.
Ending mass and temperature in steel drum: 392 lbs, 122 degrees F.
Water temperature Delta T: 69 degrees F.

Energy added to water: 69 degrees F x 392 lbs. = 27048 BTU's = 7.92 KWH
Electrical input power recorded: 7.26 KWH
(test 2 was ran for 10 minutes longer than test 1)

C.O.P. computation--

	Input KWH	C.O.P.
Apparent	7.26	109%
Adjustment for power (apparent-true) and motor efficiency (82.5%)	5.03	157%

Conclusion: excess heat energy was detected at levels far beyond any reasonable limits for error from the instrumentation used in the test.

FORCED STEAM BARREL TEST 3

On February 15,1994, Mr. Ron Dubose on behalf of ENECO visited our plant to participate in two additional tests of the Hydrosonic Pump. Mr. Dubose is a P.E. in mechanical engineering and President of Emprise Corporation in Marietta, Georgia. Emprise Corporation specializes in the design, construction and installation of testing facilities throughout the world.

The same test procedure was followed as in the two previous tests conducted earlier in the report, with the following results:

TEST 3

Starting mass and temperature of water in the drum: 325 lbs, 48 degrees F.
Ending mass and temperature in steel drum: 412 lbs, 124 degrees F.
Water temperature Delta T: 76 degrees F.

Energy added to water: 76 degrees x 412 lbs. = 31312 BTU's = 9.17 KWH
Electrical input power recorded: 8.39 KWH

C.O.P. computation--

	Input KWH	C.O.P.
Apparent	8.39	109%
Adjusted for power factor (apparent-true) and motor efficiency (82.5%)	6.23	147%

Conclusion: once again excess heat was recorded in excess of possible instrumentational error. Mr. Dubose stated in his report to ENECO dated February 16, 1994, "I could find no fault with the test technique or instrumentation. Some factors such as heat sink losses were neglected that would improve measured pump performance if they could be included. "

As stated earlier, we at Hydro Dynamics Inc., do feel that this phenomenon is real and that at some point in the near future it will be fully explained.

To quote from the great physicist, Albert Einstein, "All the laws of physics are absolute, not in the sense of being unalterable by the progress of research but in the sense I have already noted--they are consistent throughout the universe."

The two tests that have been examined in this paper were conducted under the strictest control conditions available to the researchers. Manufacturers' specifications as to the accuracy of all test equipment has been supplied in appendix B, and based on the company's interpretation of these specifications, instrumentation error cannot possibly explain away the large amounts of excess heat energy produced by the Hydrosonic Pump.

During the past three years the tests performed at Hydro Dynamics continue to indicate COP's greater than one. We believe additional research in this area must continue.

AUTHOR'S NOTE

Hydro Dynamics Inc. as a company and I myself personally invite any input in the form of recommendation, possible explanations, and criticism as to our process or testing techniques. We realize that we do not have the final answer, but the question remains open, what is the source of the "excess?" We invite anyone to our facility at anytime for a demonstration, or an attempt to prove us wrong.