

TEST TO PROOF THE LEONARDO 1 MW REACTOR WORKING BY MEANS OF LOW ENERGY NUCLEAR REACTIONS- PROTOCOL PREPARED BY THE PARTIES

The test has been performed by the Parties:

For the Customer (omissis- confidential) : ~~XXXXXX~~-Engineer Domenico Fioravanti

For the Seller: Leonardo Corporation : Dr Andrea Rossi

Expert Scientist for the measurement of the radiations outside the reactors: Dr David Bianchini (University of Bologna)

Date of the test: October 28th 2011

Time of the test: from 09.00 through 23.00

TEST PROTOCOL

The test has the goal of comparing the Energy output of the reactor made as in the description of the patent n. WO 2009/ 125444 A1 against the Energy consumption of the same.

To reach this goal we have measured the Energy input to the reactor by means of the following instrumentation:

Such instrumentation has been certified as follows:

The Energy output, or production, has been measured by means of the integral of the  $\Delta T$  of the water coolant of the reactor in function of the water flow plus the vaporization heat of the water turned into steam. To be conservative, all the water which arrived liquid at the output of the reactor has been collected and its weight has been subtracted from the amount of water that has been considered vaporized.

The water flow rate has been measured by a scaled reservoir and a chronograph all the times that the Customer's consultant has deemed it opportune. This system has been chosen by the Customer.

The temperatures of the water before and after the reactor have been measured by means of the following instrumentation, previously tested by the Customer:

Testo Data logger # 174-T2

Testo thermocouples # TESTO ALTA TEMPERATURA 0613 1212 - AG 1 ST

The positioning of the thermocouples has been chosen by the Customer

As for the radiations we have measured:

THE RADIATIONS EMITTED INTO THE ENVIRONMENT FROM THE REACTOR

The results are reported in the Attachment 1 : NO RADIATION ABOVE THE BACKGROUND HAVE BEEN REGISTERED

The Hydrogen tank has been weighted by means of a scale before and after the loading of the Hydrogen in the reactor.

Before the loading the weight measured is: 13604.5 kg

After the loading the weight measured is: 13602.8 kg

The Hydrogen tank pressure has been measured before and after the load:

Hydrogen pressure before the load: 55 BAR

Hydrogen pressure after the load: 55 BAR

Average temperature of the water at the input: 18,3 °C

Average temperature of the steam: 104,5 °C

(the diagrams of the temperatures is in the attachment 2)

Energy consumed from 12,30 (when the reactor has been turned on) and 18,00 (when the reactor has been turned off): wh 66 kWh (SIXTY SIX)

Total energy production from 12,30 through: 18,00

Water flow rate: l/h 675.6

Water not vaporized: tot l 5

Water vaporized: tot l 3716

Total Energy produced : (steam kg x 627.5) + (100 - input water T) x kg of water heated x 1.14 = 2635.033 kWh (TWO THOUSAND SIX HUNDRED THIRTY FIVE)

Ratio between Energy produced and Energy consumed (COP): 2635:0

Description of the test installation:

The 1 MW Energy Catalizer ( E-Cat) is an assembly of 107 modules of 10 kW each, connected in parallel. Each module is made by 3 sub-modules of 3.3 kW each, put in parallel.

All the modules are set in a container made by steel. The assembly is commanded by a control panel supplied with the necessary software and all the necessary electronic components, whose description has been detailed in the sale agreement. All the components result to be set as guaranteed from a preliminary check.

The dimensions of the container are:

Length 5 m

Width 2.6 m

Height 2.6 m

Weight ( declared from the Manufacturer) 10 tonnes

Noise emissions: below 50 dB(A) at 5 meters from the plant

Waste emissions: none

Gas or smoke emissions: none


Liquid emissions: none

The water is supplied to the reactors by means of 2 pumps with a flow rate capacity of 3,000 liters per hour, regulated by valve to the due flow rate of ~~7000 l/h~~  $\sim 350 \text{ l/h}$

Type of pumps: DAB Jet 82 M

The reactors have been also served by a RFG, whose data are reported in the sale agreement description. The Energy consumed by the RFG system has been calculated in the calculation of the COP.

The heat made by the reactor has been dissipated in a steam condenser and the water obtained from the condensation of the heat has been recycled to the reactor. Additional water has been added from the grid to compensate the water evaporated from the reservoir, by means of floating valves, to maintain constant the level of water in the reservoir.

 The modules have been divided in 2 rows, each with an independent pump, so that each pump has a flow rate of ~~750 kg/h~~  $\sim 700$  kg/h, for a total of ~~1,500 kg/h~~  $\sim 1,400$  kg/h.

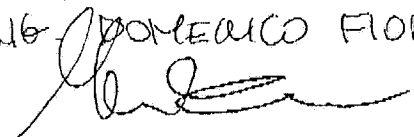
The dissipators have been designed by Leonardo Corporation, and are made by 2 air-water heat exchangers each cooled by 2 axial fans.

#### CONCLUSION:

The results of the test are satisfactory to accept the delivery.

#### RESERVES:

TO BE UPGRADED THE SYSTEM OF GASKETS. SOME LEAKS HAVE BEEN NOTICED.

~~FOR PIONEER CORPORATION~~  
ING. DOMENICO FIORAVANTI  


~~FOR PIONEER CORPORATION~~  
