

August 2020

SnowWhite² temperature monitoring and data log system

Dear Supporter,

Selective laser sintering (SLS) is a powder bed based additive manufacturing technique to produce complex three-dimensional parts.

Although every thermoplastic polymer theoretically can be processed via this technique, variable material behavior complicates the optimization of the processing parameters: (Laser power, laser speed, powder temperature).

During the process, the powder is heated to temperatures just below the melting point and kept there until the end of the construction process. The laser gives the necessary energy to active the sintering process.



This heating process in SnowWhite² is done by the energy supplied to the powder from the 4 halogen lamps and the sintering done with a 14W CO2 laser. The machine has also a heater on the inlet inert gas.



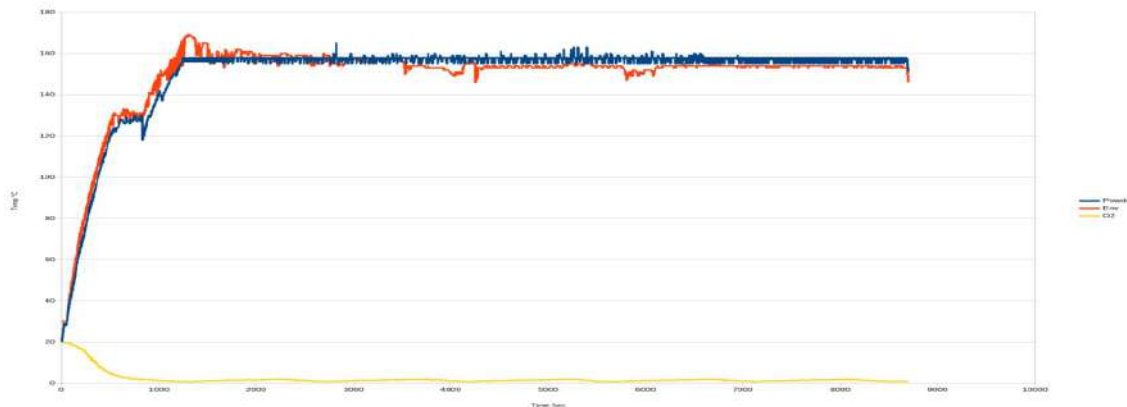
The Heating system is controlled by two sensors:

- 1) a thermistor that is used to read the environment temperature;
- 2) an IR sensor that is used to read the powder bed temperature.

The user can choose with temperature reading controls the heating system during the building process, the choice is between environmental or powder temperature. As we have complete control over the machine functions we implemented these features:

- change the temperature at a defined layer;
- define the amount of the change to not damage the object;
- heat with a particular control method that reduce the time needed to start.

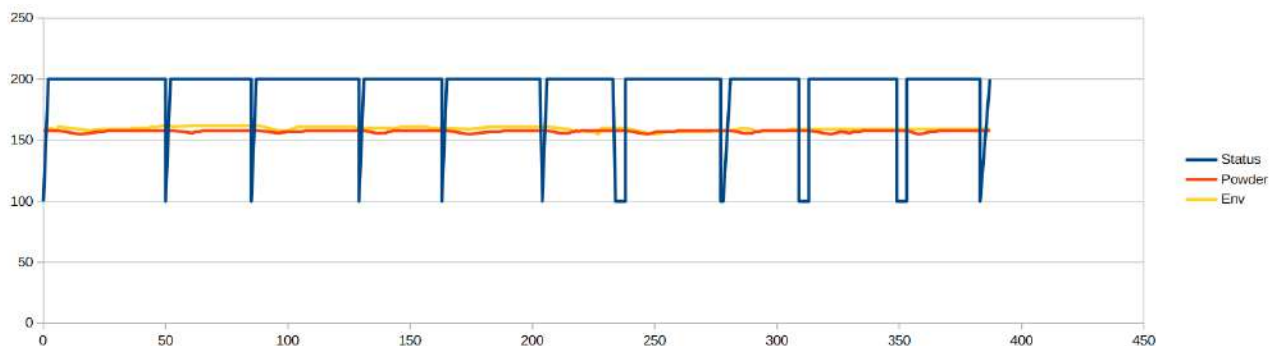
SnowWhite² has a data logging system that enables the user to make post print analysis and reports.



In the chart are showed the data from the test where:

- BLU line show the IR sensor (temperature of the powder bed);
- RED line show the thermistor (temperature of the environment in the chamber);
- YELLOW line show the O2 sensor (level of O2);

Is also possible to analyze other kind of interaction from the LOG data saved in SnowWhite².



For example in the chart are showed the data of a fraction of the test where:

- BLU line show the status of the print, it means that when the line is UP is showing the recoater moving,
when the line is down show the laser process;
- RED line show the powder temperature read with the IR sensor;
- YELLOW line show the environment temperature read with the thermistor;

With the internal camera the SnowWhite² saves two pictures of each layer, one after the laser movements and one after the powder spreading.

These tools are useful to the researcher for data collection in the analysis of new sls printing powder.

Sharebot R&D Team