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METHOD AND TOOL FOR SELF-ASSESSMENT ON MATERIAL QUALITY

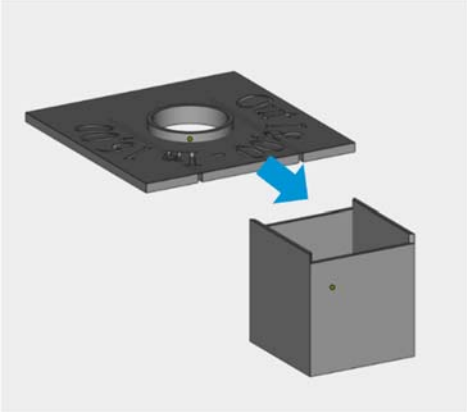
HP INC

Method and tool for self-assessment on material quality

Abstract

This method is designed to allow anyone perform a measurement of powder quality based on its color in an easy way. Using a small box for sampling collection and a lid with a specific hole on its surface, the method provides a solution for a fast analysis of powder quality on-site. It can be used by any person (no special skills needed) and it has been proven to be robust and reliable.

The hole is intended to fit with a standard commercial colorimeter. The system creates a flat horizontal surface that can be read by the colorimeter, a dark chamber that allows the measurement to be taken without external influences and a method to keep the focal distance constant, allowing different measurements to be compared among themselves.



Description of the invention

The color of the material used on in a 3D printer has a direct correlation with its thermal history of powder.

Usually in an industrial environment a spectrophotometer is not common. In that case, if a customer needs to measure the color of his powder, all solutions available to measure powder quality through color consist on taking samples and sending them to a special lab, where they would be measured. These processes also require hours or even days to produce the results. The method we present provides a process to obtain measurements of color in a few minutes. It can be performed by anyone and it offers a cheap alternative against the expensive methods used before.

There are, in the market, specific powder spectrophotometers that do not present any technical disadvantage for measuring color powder. However, they are much more expensive than a 2D one. There are also cheaper colorimeters that provide good results on 2D but present accuracy problems when

measuring powder. Our invention aims to provide a robust process of measuring powder using a 2D colorimeter

Previously, there has been other attempts to measure powder color with other tools:

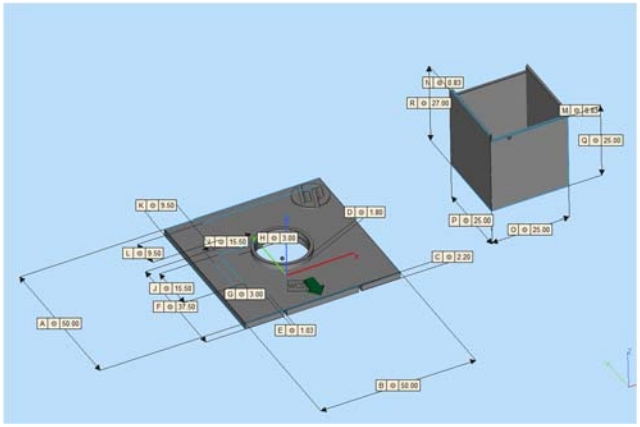
1) Using a 2D spectrophotometer and two glass holders for the powder sample: Using this method, the sample is encapsulated inside the glasses and then the spectrophotometer is located on top of it to measure. This method´s main disadvantage comes from the variability in results created by the positioning of the sample. Additionally, the glasses interfere with the light and produce fake measurements of the powder color.

2) Measuring directly on a powder layer: This method consists on measuring with a spectrophotometer directly on the powder. The disadvantage comes on the positioning of the tool. The powder is not perfectly flat and can create little "hills" on the surface that will produce false results on the tool.

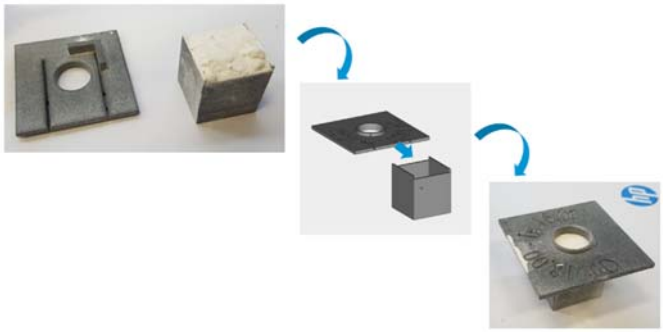
The invention we are presenting consists of two parts:

1) Box: The box is a 25x25x25mm, 5-walls cube intended to contain the sample of the material. Two of its walls are 2mm higher to create two rails where the lid will be inserted.

2) Lid: The lid is a 50x50x2,2mm square with a 8mm diameter hole in the middle, and a 1mm cylinder around the hole. In the bottom surface, it has two parallel openings inside which the box can be inserted.



Operation: The powder sample is placed inside the box, filling it to the maximum. Once the box is filled, the lid is slid through the rails and pushing the excess of powder outside, creating a flat horizontal surface of powder below the hole.



The colorimeter is placed on the hole and therefore the focal distance is maintained constant through all the measurements.

This invention presents several advantages:

1) It is very ubiquitous. It can be handed out to customers or used in the lab next to the processing station. There is no need to take the powder samples to a special lab to measure the color nor use an expensive device. The measurement can be done on site by anyone

2) It is robust at assuring adequate focal distance. Different people using different tools and different samples have tested it, and the results present a very small variation.

3) It is cheap. The tool can be 3D printed.

4) It is fast. The results can be taken in a few minutes.

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