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MACHINING SELECTION USING COLORS

HP INC

Machining selection using colors

3D printers are powerful machines for prototyping, helping companies iterate their designs much faster. 3D printers can accelerate and increase the productivity and manufacturing of 3D printed parts due to its speed and accuracy. However, some 3D printing technologies are dependent on the printer's thermodynamics. Stability in the fusing science and temperatures while printing is important in this process.

One concerns of such technology, especially in some applications such as functional prototypes, is the capability of printing parts with dimensional accuracy.

The printed parts tolerances in mass production are tighter than in prototyping. In 3D printers, due to some uncontrolled surface alterations, it may be difficult to attain some dimensional properties like flatness, cylindricity, etc. For this reason, postprocessing using machines may be used when the required tolerances are tighter than what such 3D printing technology can deliver.

Designers must specify on the drawings the required postprocessing step needed for specific parts. Once the part is printed, if the part does not comply with its specifications, a technician needs to check the drawings and apply the instructions specified therein for each of the parts.

This publication proposes a method to simplify the workflow followed in the above cases., The method explained herein makes the machining and postprocessing easier for the technician by using customizable color codes printed directly on the part (Figure 1).

This approach makes the interpretation of each part for postprocessing more intuitive and avoids the need to consult drawings, and any possible loss of information. The method enables all the information to be embedded on the part, so that the technician does not need to consult the drawings anymore. This new workflow is more agile and, thereby increases its productivity.

Adding color tags for postprocessing and machining gives the 3D color printers an advantage compared to technologies such as injection molding. Part tolerances can be added to a part using CAD designing tools by embedding metadata to each feature of the part. This metadata contains the specific postprocessing treatment.

Using this methodology, the user can apply different colors to features like, e.g., cylindricity or flatness (Figure 1). Once the parts have been printed and during the postprocessing process, the technician only needs to correlate the color in the feature with the color in a pre-defined color code table rather than checking drawings or CAD files.

This is an example of a color code table that could be used:

Property	Symbol	Color
Flatness	▱	
Cylindricity	⌭	
Parallelism	//	
Angularity	∠	
Perpendicity	⊥	

Figure 1

This method makes a faster and easier part postprocessing and avoids the usage of 2D printed drawings. The following images show some examples. However, the color tagging method can be applied to other useful information that needs to be attached to the parts for post printing analysis.

Example a)

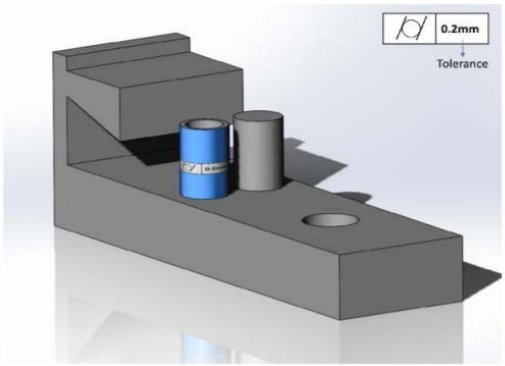

Figure 2: Dimensional tolerances could use different color codes

Example b)

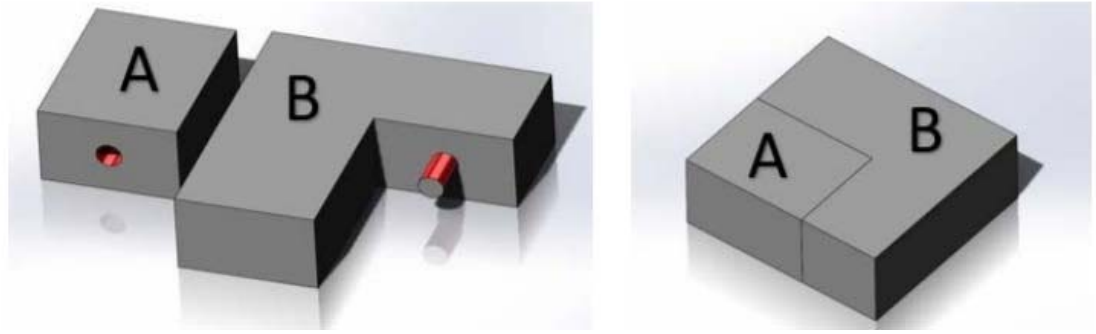

Figure 2 Color codes can also be used to mark parts that need to be assembled

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