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3D PRINTED SCREEN DIAGNOSTIC VIEWS

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3D Printed Screen Diagnostic Views

Abstract: Diagnostic views of am intricate 3D printed screen having ten thousand or more pores visually indicate whether the screen meets requirements for minimum web, open area and maximum distance between holes.

This disclosure relates to the field of additive manufacturing.

A technique is disclosed that generates diagnostics views for evaluating whether highly intricate and technically demanding 3D printed screens with tens to hundreds of thousands of pores meet requirements for minimum web, open area and maximum distance between holes.

During the creating and approval process for fiber pulp molding screens, it is extremely difficult to visually review the fidelity of the generated screen, as a screen often contains hundreds of thousands of pores (unit cells).

As a result, up to now, it has been difficult or impossible to inspect a digital screen file in a meaningful way that can assure that key criteria were met across the entire part. The workaround has been to closely inspect a subset of the holes, to get an idea of whether or not the approach was on track. However, in many cases this meant that problems would be discovered only after attempting to print, clean, or test the screens. This requires a significant amount of resources, however, and can result in unacceptable screens being produced and delivered to customers.

According to the present disclosure, a color-coded diagnostics view allows those working on and reviewing the screen to easily evaluate whether this highly intricate and technically demanding 3D printed screen with tens to hundreds of thousands of pores meet the requirements for minimum web, open area, and maximum distance between holes. In one example, a form-side surface is used to create a starting mesh. A dual decimated offset is applied where occasionally needed to contracting radii to generate a well optimized clean mesh.

The diagnostic view is the output of an algorithm that measures the distance between center-points of each hole and its neighbors. It then applies a color to indicate pass-fail tolerances and where they occur, and whether the screen generation attempts have been successful in meeting the requirements. If the requirements have been successfully met, printing approval can be given.

In one embodiment, a program is used to script the custom diagnostics. In another embodiment, the diagnostics are built right into the user interface of the software.

The disclosed technique is especially valuable when the processes used to run the boolean operations are done later, directly in the command line without any accompanying visuals.

The disclosed technique advantageously results in properly produced screens and improved customer satisfaction.

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