

How to find optimum workpiece positioning in rod type flexible fixtures?

In this paper, we introduce a novel method for optimum workpiece positioning in rod type flexible fixtures for thin-walled components. First, the geometry of the workpiece is extracted from its CAD model. Second, a geometry-based method is proposed to find the optimal location of the workpiece relative to the fixture system.

What is a non reversible phase change fixturing system?

Adhesives work holding systems can be considered as a non-reversible phase-change fixturing systems. These systems use a small volume of reactive adhesive to glue the workpiece to a set of fixturing datum pins.

What is a single component fixture?

This is in contrast with fixtures for multiple components, where the system must constrain the DoF of every component within the assemblage relative to the process end-effector. Traditionally, dedicated single-component fixtures are designed to locate and hold a specific workpiece during a manufacturing process (e.g. machining, inspection).

Does fixture layout affect thin-walled part assembly variation?

In 1999, Rikard Söderberg et al. highlighted the importance of robust locating scheme design in their paper. Furthermore, Camelio et al. gave an example to verify the influence of fixture layout on thin-walled part assembly variation in 2004. Minimization of the in-plane variations is one kind of optimization objective.

How can flexible fixtures be used in manufacturing processes of thin-walled components?

The workpiece positioning was reduced to 2D polygon problems. The number of supports was maximized by optimizing a point-in-polygon problem. The cutting-tool fixture interference was avoided automatically. Flexible fixtures are finding widespread use in manufacturing processes of thin-walled components in the automotive and aerospace industries.

What is phase change base plate fixturing?

The system, named phase change base plate fixturing, was developed specifically for thin and complex geometries and utilises a series of support pins whose lower halves have been positioned in a chamber filled with bismuth and a heating plate (Fig. 12).

Position clamps over strong support points to avoid deformation, as shown in Figures 3-23 and 3-24. Figure 3-23. Clamps should always be positioned to direct the clamping force into the supports or locators. Figure 3-24. The workpiece ...

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