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ADAPTATION OF 3D PRINTING TECHNOLOGY AND TOPOLOGICAL OPTIMIZATION METHODS FOR CREATING LOW FLOW RATE TURBOCHARGERS

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The article describes the vast experience of the Compressor holding company in creating compressor equipment for various industries. Existing methods for the development and manufacture of turbochargers are demonstrated using an example of a non-standard refrigeration compressor designed to operate on gaseous refrigerant R704. The data on the additive technologies mastered by leading foreign companies in the field of aviation and rocket science are analyzed for the manufacture of parts and assembly units using 3D printing with metal materials. The experience of applying topological optimization methods in aircraft and rocket science is considered. The conclusion is drawn on the applicability of topological optimization methods for creating turbocompressor elements together with 3D printing technology. A method is proposed for creating non-standard low-consumption turbochargers providing a reduction in material consumption and an increase in the strength of parts and assemblies, including the stages of design calculation, preliminary calculation, building a 3D model, phased topological optimization, verification of loads, verification of technology, manufacturing using 3D printing, 3D scanning to confirm compliance of the printed part specified geometric properties, verification of the part for compliance with mechanical properties.

Keywords: turbocharger, 3D printing, 3D scanning, load optimization, design calculation.

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