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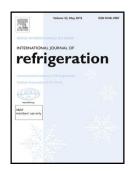
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Experimental study of the axial force on the rotors in a twin-screw

refrigeration compressor

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Highlights

• An experimental study of the axial force on the twin-screw compressor rotors was

conducted.

The mean pressure model and sector pressure model are proposed to calculate the

axial force on the end face.

The sector pressure model is more accurate in predicting the axial force.

The axial force on the rotor end face has more significant influence than that on the

rotor helical surface.

Abstract

The high operating pressure of a twin-screw compressor employed in high temperature heat

pump or NH₃/CO₂ cascade refrigeration systems often leads to extremely large axial force on

the compressor rotors. Accurate calculation of this axial force is very important in selection of

bearing and design of balancing pistons. In this paper, an experimental study of the axial force

on the twin-screw compressor rotors was conducted. The variations of the axial force under

different operating conditions were investigated. Furthermore, the axial force was also

calculated by employing the mean pressure model and sector pressure model, and was

compared with that of the experimental results. It was concluded that the sector pressure

model is more accurate in predicting the axial force on the rotors in comparison with that of

the mean pressure model. However, the mean pressure model was more accurate under

operating conditions with large built-in volume ratio. Moreover, the axial force on the rotor

end face was found to have larger influence than that on the rotor helical surface.

Keywords: Twin-screw compressor; Refrigeration; Axial force; Balance piston

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