

ASSESSMENT OF SIMPLIFYING HYPOTHESES ADOPTED FOR VALVE LEAKAGE MODELING

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The reed-type valves employed in refrigeration compressors must provide adequate sealing when closed to avoid leakage of gas between the compression chamber and the suction and discharge chambers. Recent studies show that valve leakage can considerably affect the performance of the small reciprocating compressors used for domestic refrigeration. The present paper reports an investigation on the adequacy of simplifying the hypothesis adopted in the simulation models of valve leakage. The results indicate that the transient effects related to both the valve deflection and fluid flow are negligible. Also, the ideal gas formulation was found suitable in some operating conditions found in domestic refrigeration. On the other hand, leakage was found to be overpredicted by almost 20 % when the reed valve geometry was simplified to a circular plate in order to reduce the computational processing cost.

Keywords: reciprocating refrigeration compressor, valve, overflow, mathematical model, numerical experiment, verification.

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For citations

De Luca L. G. M., Silva E., Deschamps C. J. Assessment of simplifying hypotheses adopted for valve leakage modeling / trans. from Engl. M. A. Fedorova // Omsk Scientific Bulletin. Series Aviation-Rocket and Power Engineering. 2020. Vol. 4, no. 2. P. 85–95. DOI: 10.25206/2588-0373-2020-4-2-85-95.

Received April 15, 2020.

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