

# **Modeling of rotary vane compressor applying Artificial Neural Network**

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## **Abstracts**

The thermal modeling of rotary vane compressor (RVC) was performed in this paper by applying Artificial Neural Network (ANN) method. In the first step, appropriate tests were designed and experimental data were collected during steady state operating condition of RVC in the experimental setup. Then parameters including refrigerant suction temperature and pressure, compressor rotating speed as well as refrigerant discharge pressure were adjusted. With these input values, the operating output parameters such as refrigerant mass flow rate and refrigerant discharge temperature were measured. In the second step, the experimental results were used to train ANN model for predicting RVC operating parameters such as refrigerant mass flow rate and compressor power consumption. These predicted operating parameters by ANN model agreed well with the experimental values with correlation coefficient in the range of 0.962-0.998, mean relative errors in the range of 2.79-7.36% as well as root mean square error (RMSE) 10.59  $\text{kg h}^{-1}$  and 12 K for refrigerant mass flow rate and refrigerant discharge temperature, respectively. Results showed closer predictions with experimental results for ANN model in comparison with nonlinear regression model.

**Keywords: Neural network, Rotary compressor, Automobile, Air conditioning**

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