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Increasing heat rejection of AC Unit condenser placed in rooftop in a Bus

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Abstract

Homogeneously cooling performance in passenger buses with large interior volumes is an increasingly important issue for passenger comfort. Due to large interior volume in passenger buses, cabin cooling may take a long time to provide the cabin regime temperature. For this reason, it is getting more important for passenger comfort that cooling cycle in the air conditioning unit located in the ceiling section of passenger buses should work in optimum condition and safely. In this study, a bus developed by ANADOLU ISUZU has experienced an increase in the compressor output pressure value with the increasing refrigerant temperature in cooling circuit activated the air conditioner, and a decrease in the cooling load to be sent to the cabin has occurred. There are many variables for improvement of the refrigeration cycle, and this will increase the time spent on the improvement. It is aimed to produce solutions with minimum variables. For this reason, CFD simulations were carried out in Ansys FLUENT 2020 software to intake more air in the condenser and reduce the temperature of the system circuit. For the simulations, the temperature of the cycle was reduced by using the RANS equations. With the work done, this study provides a development purpose for many new vehicles that will be released to the market.

Keywords: Aerodynamics, Bus, CFD, Cooling Performance, HVAC