

ABSTRAK

Semakin bertambah ketinggian jelajah (*altitude*) pesawat maka tekanan dan suhu di sekitar pesawat akan semakin rendah, sehingga diperlukan sistem refrigerasi yang memenuhi syarat untuk kondisi pada ketinggian *sea level* dan tinggi jelajah maksimum. Beberapa hal menyebabkan terjadinya kenaikan temperatur pada kabin. Oleh karena itu, perlu dilakukan analisa dan perhitungan beban pendinginan sehingga diketahui beban yang ditanggung oleh mesin pendingin untuk pesawat berkapasitas 180 penumpang dari dalam kabin pada 2 kondisi yang berbeda; *Ground Idle* dan *Maximum Cruise*.

Tujuan penelitian ini adalah mengetahui sistem pengondisian udara yang digunakan pada pesawat terbang dan menghitung beban pendinginan untuk pesawat berkapasitas 180 penumpang pada dua keadaan yaitu pada saat di *Ground Idle* dan *Maximum Cruise*. Metode penghitungan beban pendinginan (*Cooling Load*) menggunakan metode CLTD (*Cooling Load Temperature Difference*) berdasarkan buku dan tabel *Air Conditioning Principles and System*. Yang dihitung adalah *Room Heat Gains* (panas dari lampu, manusia, *equipment*, lantai, dinding, atap) dan *grand total heat*. Total penghitungan dibandingkan dengan *Grand Total Heat* pesawat yang sudah ada kemudian dianalisis. Hasil total penghitungan secara teoritis didapatkan beban pendinginan sebesar 137.764,534 (Btu/hr) untuk kondisi *Ground Idle* dan 116.096,626 (Btu/hr) di kondisi *Maximum Cruise*.

Kata kunci: *cooling load, Ground Idle, Maximum Cruise, metode CLTD (Cooling Load Temperature Difference)*

ABSTRACT

The increasing altitude of the aircraft affects the pressure and temperature around the aircraft lower, so that a refrigeration system that is eligible for condition at sea level and maximum cruising height is required. Some cases cause of the increase of temperature in the cabin. Therefore, analysis and the calculation on the cooling load is required so the load of the cooling machine for the aircraft with capacity of 180 passengers from inside the cabin in 2 different conditions; Ground Idle and Maximum Cruise is indentified.

The objective of this research was to identify the air conditioning system used in aircraft and calculate the cooling load for the aircraft with capacity of 180 passengers in two conditions; Ground Idle and Maximum Cruise. The cooling load calculation method used CLTD (Cooling Load Temperature Difference) based on book and table Air Conditioning Principles and System. The calculation was for the room heat gains (heat from lights, man, the equipment, floor, wall, roof) and grand total heat. The total calculations were compared to the existing planes and then were analyzed. The total theoretical calculation result obtained that the cooling load was 137.764,534 (Btu/hr) for the Ground Idle condition and 116.096,626 (Btu/hr) for the Maximum Cruise condition.

Keywords: *cooling load, Ground Idle, Maximum Cruise, method CLTD (Cooling Load Temperature Difference)*