

ABSTRAK

Sewage Treatment Plant (STP) adalah infrastruktur penting untuk mengelola air limbah domestik guna mengurangi dampak polusi lingkungan. Proses pengolahan limbah di STP dapat menghasilkan gas polutan dan bau tak sedap yang memengaruhi lingkungan serta keselamatan dan kenyamanan operator. Oleh karena itu, kondisi udara di dalam ruang STP perlu dikendalikan agar memenuhi standar kualitas udara. Namun, hingga saat ini, belum ada pedoman teknis yang jelas untuk pengkondisian udara di ruang STP. Penelitian ini menguraikan pengembangan perhitungan beban pendinginan dengan metode Cooling Load Temperature Differential (CLTD) untuk merancang sistem ventilasi yang efektif di ruang STP. Tujuan penelitian ini adalah menciptakan kondisi udara ideal sesuai dengan Keputusan Menteri Kesehatan Republik Indonesia Nomor 1405/MENKES/SK/XI/2002 tentang Persyaratan Kesehatan Lingkungan Kerja Perkantoran dan Industri, yaitu suhu sebesar $28^{\circ}\text{C} \sim 30^{\circ}\text{C}$ dengan kelembapan relatif 40% ~ 60%. Metode perhitungan yang digunakan menggunakan metode Cooling Load Temperature Difference. Data temperatur luar ruangan sebesar 33°C dengan RH 60%, bulan terpanas September, serta perhitungan beban pendinginan dilakukan pada pukul 10.00 sampai 16.00 WIB, didapatkan suhu sebesar 28°C dengan kelembapan relatif 60% dengan ACH 28, 35 dan 40 memiliki puncak beban pendinginan masing-masing yakni ruang STP sebesar 568,995 btu/h, 584521 btu/h & 603316 btu/h. Didapatkan suhu udara sebesar 28°C .

Kata Kunci : *Sewage Treatment Plant (STP)*, Metode *Cooling Load Temperature Differential (CLTD)*, Ventilasi

ABSTRACT

The Sewage Treatment Plant (STP) is an essential infrastructure for managing domestic wastewater to reduce environmental pollution impacts. The wastewater treatment process in STPs can generate pollutant gases and unpleasant odors that affect the environment as well as the safety and comfort of operators. Therefore, the air conditions inside the STP need to be controlled to meet air quality standards. However, to date, there are no clear technical guidelines for air conditioning in STP spaces. This research outlines the development of cooling load calculations using the Cooling Load Temperature Differential (CLTD) method to design an effective ventilation system in STP spaces. The aim of this research is to create ideal air conditions in accordance with the Indonesian Minister of Health's Decision Number 1405/MENKES/SK/XI/2002 regarding the Environmental Health Requirements for Office and Industrial Workplaces, which stipulates a temperature of 28°C ~ 30°C with relative humidity of 40% ~ 60%. The calculation method used is the Cooling Load Temperature Difference method. Outdoor temperature data of 33°C with 60% relative humidity, the hottest month being September, and cooling load calculations performed from 10:00 AM to 4:00 PM WIB (Western Indonesian Time), resulted in a temperature of 28°C with 60% relative humidity. Air changes per hour (ACH) of 28, 35, and 40 have respective peak cooling loads for the STP space of 568,995 btu/h, 584,521 btu/h, and 603,316 btu/h. The air temperature obtained is 28°C.

Keywords : Sewage Treatment Plant (STP), Cooling Load Temperature Differential (CLTD) Method,