

A Study on The Development of Local Exhaust Ventilation System (LEV's) for Installation of Laser Cutting Machine

S. I. Harun, S. R. A. Idris*, N. Tamar Jaya

Faculty of Mechanical Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia.

E-mail: rabiattull@ump.edu.my

Abstract. Local exhaust ventilation (LEV) is an engineering system frequently used in the workplace to protect operators from hazardous substances. The objective of this project is design and fabricate the ventilation system as installation for chamber room of laser cutting machine and to stimulate the air flow inside chamber room of laser cutting machine with the ventilation system that designed. LEV's fabricated with rated voltage D.C 10.8V and 1.5 ampere. Its capacity 600 ml, continuously use limit approximately 12-15 minute, overall length LEV's fabricated is 966 mm with net weight 0.88 kg and maximum airflow is 1.3 meter cubic per minute. Stimulate the air flow inside chamber room of laser cutting machine with the ventilation system that designed and fabricated overall result get 2 main gas vapor which air and carbon dioxide. For air gas which experimented by using anemometer, general duct velocity that produce is same with other gas produce, carbon dioxide which 5 m/s until 10 m/s. Overall result for 5 m/s and 10 m/s as minimum and maximum duct velocity produce for both air and carbon dioxide. The air gas flow velocity that captured by LEV's fabricated, 3.998 m/s average velocity captured from 5 m/s duct velocity which it efficiency of 79.960% and 7.667 m/s average velocity captured from 10 m/s duct velocity with efficiency of 76.665%. For carbon dioxide gas flow velocity that captured by LEV's fabricated, 3.674 m/s average velocity captured from 5 m/s duct velocity which it efficiency of 73.480% and 8.255 m/s average velocity captured from 10 m/s duct velocity with efficiency of 82.545%.

