The Life-time Study of Gas Ratio and Pressure Relationship for Sealed-off CO2 Laser Tube

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ABSTRACT

CO2 laser surgical techniques can be applied to surgery , obstetrics, dermatology, dentistry, plastic surgery, ENT, and cosmetically related surgeries, etc. The body tissues can be examined without physical contact during a laser surgery, therefore, incidental infections can be avoided. Meanwhile, laser surgery offers patients the best quality medical treatment with its precise, hygienic, swift cutting and, immediate blood clotting, as well as provides a strong ability of gasifying human tissues. If we can optimize the most favorable gas ratio inside the CO2 laser tube and utilize this proportionality to extend the lifespan of such device,we can hence to keep the purchasing and the maintenance cost down to an acceptable range for any doctors or physicians. This study uses a variety of experiments to analyze the relationship between the lifetime of the sealed-off CO2 laser tubes, the gas components ratio, and pressure inside the tube. Using the fact that helium gas atoms will decrease in number in the mixed gas inside the laser tube due to their susceptibility to infiltration, three different ratios of mixed gases were investigated respectively in the CO2 laser tube. With a controlled period of obseration time ,we compared the related gas ratio which would provide the required efficiency, as well as the longest lifespan. Furthermore, three different pressures were also studied accordingly for the previously determined mixed gas ratio to obtain the most optimal pressure with respect to the gas ratio and thus achieve the goal of prolonging the lifespan of CO2 laser tubes.

Keywords : co2 laser ; sealed-off laser tube ; laser tube gas ratio

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REFERENCES

1.SHARPLAN COMPACT CO2 LASER SERVICE MANUAL,以色列原廠雷射維修手冊,1996 年. 2.SHARPLAN 733A CO2 LASER

SERVICE MANUAL,以色列原廠雷射維修手冊,1990 年. 3.雷射原理與量測概論,楊國輝,黃宏彥編著,五南圖書出版有限公司,2001 年. 4.光電工程,丁勝懋編著,中國電機工程學會,1999 年. 5.光電及雷射概論,廖偉民編著,亞東書局,1987 年. 6.Fundamentals of Photonics,BAHAA E.A.SALEH,MALVIN CARL TEICH. 7.高電壓工程,顏世雄編著,新學識文教出版中心,1989年. 8.工業安全,工業安全編輯委員會編著,先鋒企管出版,1898年. 9.FIBER-PTIC COMMUNICATIONS TECHNOLOGY,DJAFAR K.MYNBAEV,LOWELL L.SCHEINER. 10.LASER ELECTRONICS,JOSEPH T.VERDEYEN,PRENTICE-HALL,INC.