

RESEARCH OBJECTIVE:

The purpose of this research is to analyze the Carmanhaas model, which is a 2-dimensional model used to study the behavior of particles in a fluid medium. The model is based on the principles of fluid dynamics and is used to predict the motion of particles in a flow field.

RESEARCH QUESTIONS:

- (1) How does the Carmanhaas model relate to the Reynolds number?
- (2) What are the limitations of the Carmanhaas model?
- (3) How does the Carmanhaas model compare to other models?
- (4) What are the applications of the Carmanhaas model?
- (5) How can the Carmanhaas model be improved?

RESEARCH METHOD:

The research method used in this study is a combination of theoretical analysis and numerical simulation. The theoretical analysis involves the derivation of the Carmanhaas model equations, while the numerical simulation involves the use of a finite difference method to solve the equations. (See [Appendix 2: Carmanhaas Model Equations](#))





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Applicable Materials

Material	Fiber Laser	Material	Co2 Laser
Stainless Steel	✓	Wood	✓
Aluminum	✓	Acrylic	✓
ABS	✓	Fabric	✓
Brass	✓	Glass	✓
Carbon Fiber	✓	Coated Metals	✓
Carbon Nanotube	✓	Ceramic	✓
Cobalt Chrome Steel	✓	Delrin	✓
Colored Delrin	✓	Cloth	✓
Copper	✓	Leather	✓
Diallyl Phthalate	✓	Marble	✓
Glass Filled PEEK	✓	Matte Board	✓
Glass Filled Teflon	✓	Melamine	✓
Magnesium	✓	Paper	✓
Metal Plated Ceramics	✓	Mylar	✓
Molybdenum	✓	Pressboard	✓
Mild Steel	✓	Rubber	✓
Nylon	✓	Wood Veneer	✓
Polybutylene Terephthalate	✓	Fiberglass	✓
Polysulphone	✓	Painted Metals	✓
PET	✓	Tile	✓
Santoprene	✓	Plastic	✓
Silicon Carbide	✓	Cork	✓
Silicon Steel	✓	Corian	✓
Silicon Wafers	✓	Anodized Aluminum	✓



Technical Parameters:

P/N	LMCH-20	LMCH-30	LMCH-40	LMCH-60
Laser Output Power	20W	30W	40W	60W
Wavelength	10.6um/9.3um	10.6um/9.3um	10.6um/9.3um	10.6um
Beam Quality	≤ 1.2	≤ 1.2	≤ 1.2	≤ 1.2
Marking Area	50x50~300x300mm	50x50~300x300mm	50x50~300x300mm	50x50~300x300mm
Marking Speed	$\leq 7000\text{mm/s}$	$\leq 7000\text{mm/s}$	$\leq 7000\text{mm/s}$	$\leq 7000\text{mm/s}$
Minimum line width	0.1mm	0.1mm	0.1mm	0.1mm
Minimum character	0.2mm	0.2mm	0.2mm	0.2mm
Repeat accuracy	$\pm 0.003\text{mm}$	$\pm 0.003\text{mm}$	$\pm 0.003\text{mm}$	$\pm 0.003\text{mm}$
Electricity	220 \pm 10%, 50/60Hz, 5A	220 \pm 10%, 50/60Hz, 5A	220 \pm 10%, 50/60Hz, 5A	220 \pm 10%, 50/60Hz, 5A
Machine Size	750mmx600mmx1400mm	750mmx600mmx1400mm	750mmx600mmx1400mm	750mmx600mmx1400mm
Cooling system	Air Cooling	Air Cooling	Air Cooling	Air Cooling







CERTIFICATE

ATTESTATION CERTIFICATE OF MACHINERY AND LOW VOLTAGE DIRECTIVES

Technical file of the company mentioned below has been observed and audit has been completed successfully. 2006/42/EC Machinery Directive and 2014/35/EU Low Voltage Directive have been taken as references for these processes

Company Name : **Camnan HAAS Laser Technology (Suzhou) Co., Ltd.**

Company Address : No 155, West Road Suhong, Suzhou Industrial Park, Suzhou City, Jiangsu , P.R.China

Related Directives and Annex : **Low Voltage Directive 2014/35/EU
Machinery Directive 2006/42/EC**

Related Standards : **EN ISO 12100:2010; EN 60204-1:2006+A1:2009+AC:2010**

Product Name : **Laser Marking Machine**

Report No and Date : SD-90049717:09.08.2018

Product Brand/Model/Type : LMCH-3W,LMCH-5W,LMCH-10W,LMCH-15W,LMCH-20W,LMCH-25W,
LMCH-30W,LMCH-50W,LMCH-60W,LMCH-70W,LMCH-100W,
LMCH-120W,LMCH-150W,LMCH-200W,LMCH-300W,LMCH-500W

Certificate Number : **M.2018.201.N6073**

Initial Assessment Date : 10.08.2018

Registration Date : 13.08.2018

Reissue Date/No :

Expiry Date : **12.08.2023**

U. Bayraktar
UDM International Certification
Auditing Training Centre Industry
and Trade Inc. Co.



The validity of the certificate can be checked through www.udem.com.tr. The CE mark shown on the right can only be used under the responsibility of the manufacturer with the completion of EC Declaration of Conformity for all the relevant Directives. This certificate remains the property of UDEM International Certification Auditing Training Centre Industry and Trade Inc. Co. to whom it must be returned upon request. The above named firm must keep a copy of this certificate for 15 years from the registration of certificate. This certificate only covers the product(s) stated above and UDEM must be notified in case of any changes on the product(s)
Address: Mulkikent Mahallesi 2073 Sokak (Eski 93 Sokak) No:10 Çankaya - Ankara - TÜRKİYE
Phone: +90 0312 443 03 90 Fax: +90 0312 443 03 70
E-mail: info@udemtd.com.tr www.udem.com.tr



Certificate of Approval

Certificate No.: 10119Q12565ROM

Awarded to

**Carman Haas Laser Technology(SuZhou)
Co., Ltd.**

Organization Code Certificate No. / Unified Social Credit Code:91320594MA1MF4EP56
Add.:No.155, West Road Suhong, Suzhou Industrial Park, Suzhou City, Jiangsu Province, P.R. China. 215000

Beijing ZhongLian TianRun Certification Center (ZLTR) certify that the
Quality Management System of the above organization has been assessed and found to be
in accordance with the requirements of the standard:
GB/T19001-2016 / ISO9001:2015

SCOPE OF CERTIFICATION/REGISTRATION

The Research and Development and Production of Optics Lenses (Except the limits of national laws and regulations.)

This certificate is made valid when used with certification scopes and the requirements of applicable laws and regulations. These requirements include, but are not limited to, administrative permits, scopes of qualifications, and CCC requirements.

Subject to operation conditions in requirements conformity with Quality Management System,

This Certificate is valid for a period of three years only,
Date from: Mar 13th,2019 To: Mar 12th,2022

The effectiveness of this Certificate shall be Validated by periodic surveillance audit
of ZLTR for maintenance.

Information of this certificate can be found on the official website of Beijing Zhonglian Tianrun
Certification center (<http://www.zltr.com.cn>)



Beijing Zhongliantianrun Certification Center

Room2603, 22nd Floor, 2nd Unit, Block 1, No.4 Yard, Qiayang Road, Chaoyang District, Beijing, P.R. China 100102

Information of this certificate can be found on the official website of Certification and Accreditation Administration of the People's Republic of China (<http://www.cca.gov.cn>)

ISO 9001

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木箱包裝 規格

木箱包裝 規格	木箱包裝 規格 說明 詳細 說明
木箱包裝 規格	80x90x58cm
木箱包裝 規格	90個裝
木箱包裝 規格	木箱包裝 規格 說明 詳細 說明 2 個裝 規格 說明

說明:

木箱包裝, 木箱包裝, FedEx, 木箱包裝, 木箱包裝 etcFor 木箱包裝 規格 說明 詳細 說明 木箱包裝 規格 說明 木箱包裝 規格 說明, Exwork, 木箱包裝, CNF, 木箱包裝 規格 說明 木箱包裝 規格 說明 木箱包裝 規格 說明 木箱包裝 規格 說明 木箱包裝 規格 說明 木箱包裝 規格 說明 木箱包裝 規格 說明 木箱包裝 規格 說明



Q4) 請說明 貴公司目前所生產之產品之主要用途為何？

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Q1) 請說明 貴公司目前所生產之產品之主要用途為何？

A1: 本公司目前所生產之產品之主要用途為何？

Q2) 請說明 貴公司目前所生產之產品之主要用途為何？

A2: 本公司目前所生產之產品之主要用途為何？

Q3) 請說明 貴公司目前所生產之產品之主要用途為何？

A3: 本公司目前所生產之產品之主要用途為何？

Q4) 請說明 貴公司目前所生產之產品之主要用途為何？

A4: 本公司目前所生產之產品之主要用途為何？

Q5) May 請說明 貴公司目前所生產之產品之主要用途為何？

A5: 本公司目前所生產之產品之主要用途為何？

Q6) 請說明 貴公司目前所生產之產品之主要用途為何？

A6: 本公司目前所生產之產品之主要用途為何？

Q7) 請說明 OEM 與 ODM 之區別為何？

A7: 請說明 OEM / ODM 之區別為何？

Q8) 請說明 貴公司目前所生產之產品之主要用途為何？

A8: 本公司目前所生產之產品之主要用途為何？