



Certificate No. : L0091-200224

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

**Aeronautical Systems Research Division, NCSIST
STRUCTURE AND MATERIALS TEST LABORATORY**

P.O.Box 90008-11-3, Taichung, Taiwan (R.O.C.)

is accredited in respect of laboratory

Accreditation Criteria : ISO/IEC 17025:2017;CNS 17025:2018
Accreditation Number : 0091
Originally Accredited : June 01, 1994
Effective Period : February 26, 2020 to February 25, 2023
Accredited Scope : Testing Field, see described in the Appendix

Chung-Lin Wang

Chung-Lin Wang
President, Taiwan Accreditation Foundation
Date: February 24, 2020





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Accreditation Number : 0091

Laboratory Head : LIN, Ming-Huang

■ 01. 01 Metals and Alloys Products

CRES 400 series Stainless Steel

C001 Elemental Analysis

CNS 10006

C: (0.0147 to 1.03) %

Si: (0.147 to 1.03) %

Mn: (0.00627 to 1.42) %

P: (0.00199 to 0.0607) %

S: (0.00209 to 0.0484) %

Cr: (9.07 to 23.86) %

Mo: (0.0346 to 1.63) %

Ni: (0.00404 to 6.12) %

Cu: (0.00106 to 0.199) %

V: (0.00526 to 0.239) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 01 Metals and Alloys Products

Stainless Steel

C001 Elemental Analysis

CNS 10006

C: (0.0233 to 0.363) %

Si: (0.0449 to 1.72) %

Mn: (0.0593 to 2.59) %

P: (0.00594 to 0.0595) %

S: (0.00245 to 0.0502) %

Cr: (12.4 to 25.54) %

Mo: (0.0764 to 3.48) %

Ni: (4.12 to 21.31) %

Cu: (0.0257 to 3.63) %

Co: (0.0278 to 0.368) %

Nb: (0.015 to 1.01) %

V: (0.0119 to 0.295) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 01 Metals and Alloys Products

Low Alloy Steel

C001 Elemental Analysis

ASTM E415

C: (0.0378 to 1.31) %

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Si: (0.036 to 1.15) %
Mn: (0.00868 to 1.32) %
P: (0.00158 to 0.0761) %
S: (0.00216 to 0.0583) %
Cr: (0.00139 to 2.32) %
Mo: (0.028 to 1.0) %
Ni: (0.00156 to 4.2) %
Cu: (0.00254 to 0.704) %
V: (0.00416 to 0.511) %
Al: (0.0103 to 0.33) %
Co: (0.00355 to 0.111) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 01 Metals and Alloys Products

Carbon Steel

C001 Elemental Analysis

ASTM E415

C: (0.0173 to 0.977) %
Si: (0.00255 to 3.24) %
Mn: (0.00525 to 1.49) %
P: (0.00167 to 0.0749) %
S: (0.00208 to 0.105) %
Cr: (0.00197 to 0.258) %
Mo: (0.00461 to 0.183) %
Ni: (0.00391 to 0.185) %
Al: (0.00263 to 0.111) %
Cu: (0.00173 to 0.277) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 01 Metals and Alloys Products

Metallic Materials

M002 Elevated Temperature Tension

ASTM E21

Load: (200 to 18000) lbf

Temperature: R.T. to 1000 °C

Approval Signatory: LI, Jyun-Lin; LIN, Sang-Chaur; CHEN, Chih-Lang

M002 Tension

ASTM E8/E8M

Load: (200 to 18000) lbf

Approval Signatory: LI, Jyun-Lin; LIN, Sang-Chaur; CHEN, Chih-Lang





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M006 Fatigue
ASTM E466
Load: (300 to 19000) lbf
Temperature: R.T.to 700 °C

Approval Signatory: LI, Jyun-Lin; LIN, Sang-Chaur; CHEN, Chih-Lang

■ 01. 01 Metals and Alloys Products
Superalloy Forging Stock and Forgings
M008 Metallography (Grain Size)
ASTM E112
ASTM E930
ASTM E1181
Comparison Procedure: plate I #0 to #10

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 01 Metals and Alloys Products
Gears, Steel
M008 Decarburization Depth Measurement (Microscopical Method)
ASTM E1077
Max to 1.0 mm

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 01 Metals and Alloys Products
Billets Bars, Blooms, Forgings
M008 Metallography (Macroetch Test)
ASTM A604/A604M
ASTM E340
ASTM E381

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 01 Metals and Alloys Products
Billets, Bars, Blooms
M008 Metallography (Grain Size)
ASTM E112
ASTM E930
ASTM E1181
Comparison Procedure: plate I #0 to #10

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan





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■ 01. 01 Metals and Alloys Products
Billets, Bars, Forgings
M008 Metallography (Inclusion Content Test)
ASTM E45
Sulfide Type, Alumina Type, Silicate Type, Globular Oxide Type

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 01 Metals and Alloys Products
Test Specimen
M101 Rockwell Hardness Test
ASTM E18
(60 to 100) HRBW
(20 to 65) HRC

Approval Signatory: LI, Jyun-Lin; LIN, Sang-Chaur; CHEN, Chih-Lang

M999 Tests for Metals and Metal Products
ASTM E399
(0.9 to 77) kN
(200 lbf to 17000 lbf)

Approval Signatory: LI, Jyun-Lin; LIN, Sang-Chaur; CHEN, Chih-Lang

■ 01. 01 Metals and Alloys Products
Test Specimen and Products
M102 Brinell Hardness
ASTM E10
(105 to 125) HBW 10/500
(100 to 650) HBW 10/3000

Approval Signatory: LI, Jyun-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 02 Metals and Alloys Products
1000, 6000 series of Aluminium Alloy
C001 Elemental Analysis
ASTM E1251
Si: (0.024 to 1.25) %
Fe: (0.047 to 0.971) %
Cu: (0.00207 to 0.838) %
Mn: (0.00119 to 0.812) %
Mg: (0.089 to 2.44) %
Zn: (0.00296 to 1.03) %
Ni: (0.0019 to 0.293) %
Cr: (0.00089 to 0.357) %
Ti: (0.00118 to 0.182) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

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■ 01. 02 Metals and Alloys Products
2000 series of Aluminium Alloy
C001 Elemental Analysis
ASTM E1251
Si: (0.0332 to 1.45) %
Fe: (0.0471 to 1.15) %
Cu: (2.71 to 6.21) %
Mn: (0.00175 to 0.819) %
Mg: (0.00197 to 1.58) %
Zn: (0.00256 to 0.467) %
Ni: (0.00206 to 2.23) %
Cr: (0.00065 to 0.142) %
Ti: (0.00119 to 0.205) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 02 Metals and Alloys Products
4000 series and Casting of Aluminium Alloy
C001 Elemental Analysis
ASTM E1251
Si: (6.66 to 9.54) %
Fe: (0.0482 to 1.03) %
Cu: (0.00113 to 3.56) %
Mn: (0.0345 to 0.448) %
Mg: (0.104 to 1.01) %
Zn: (0.00113 to 0.344) %
Ni: (0.0202 to 0.442) %
Cr: (0.00118 to 0.401) %
Ti: (0.00098 to 0.173) %
Be: (0.0124 to 0.244) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 02 Metals and Alloys Products
5000 series of Aluminium Alloy
C001 Elemental Analysis
ASTM E1251
Si: (0.0237 to 0.67) %
Fe: (0.0455 to 0.981) %
Cu: (0.00204 to 0.299) %
Mn: (0.052 to 0.823) %
Mg: (1.01 to 5.29) %
Zn: (0.00812 to 0.258) %
Ni: (0.00152 to 0.218) %
Cr: (0.0477 to 0.32) %
Ti: (0.00182 to 0.219) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei





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■ 01. 02 Metals and Alloys Products
7000 series of Aluminium Alloy
C001 Elemental Analysis
ASTM E1251
Si: (0.0389 to 0.48) %
Fe: (0.0496 to 0.998) %
Cu: (0.00189 to 6.18) %
Mn: (0.041 to 0.564) %
Mg: (0.0873 to 3.56) %
Zn: (0.00215 to 7.52) %
Ni: (0.00282 to 0.541) %
Cr: (0.00137 to 0.217) %
Ti: (0.02 to 0.242) %
Zr: (0.119 to 0.184) %

Approval Signatory: LEE, Cheng-En; CHEN, Chih-Lang; TUNG, Yu-Wei

■ 01. 02 Metals and Alloys Products
Airplane Structure
M006 Fatigue Test
In-House Testing Method (Document No.: C-140-133)
1.Load channel: (1 to 40) channel
2.Max. Force: 220 kN
3.Max. Measurement channel: 144 channel

Approval Signatory: WANG, Ching-Yu; WANG, Gee-Huei; WU, Shih-Chu; LIN, Yu-Shan

■ 01. 02 Metals and Alloys Products
Aluminium Bars and Forgings
M008 Metallography (Macroetch)
ASTM E340

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 02 Metals and Alloys Products
Aluminium Forging Stock and Forgings
M008 Metallography (Grain Size)
ASTM E112
ASTM E930
ASTM E1181
Comparison Procedure: plate I #00 to #7

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan





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■ 01. 02 Metals and Alloys Products
Aluminium Alloys Sheets and Plates
M009 Metal and Oxide Coating Thickness (Microscopical Method)
ASTM B487
> 0.5 μm

Approval Signatory: LI, Song-Lin; CHEN, Chih-Lang; CHEN, Ping-Nan

■ 01. 02 Metals and Alloys Products
Landing Gear
M014 Static Test
In-House Testing Method (Document No.: C-140-118)
1.Load channel: (1 to 40) channels
2.Max. Force: 220 kN
3.Max. Measurement channels: 144 channels
Include On-site Testing

Approval Signatory: WANG, Ching-Yu; WANG, Gee-Huei; WU, Shih-Chu; LIN, Yu-Shan

■ 01. 02 Metals and Alloys Products
Metallic Materials
M999 Creep Test
ASTM E139
Load: (1200 to 2400) lbf, (6 to 48) kN
Temperature: (100 to 1200) °C

Approval Signatory: LI, Song-Lin; Lin, Meng-Hung; Hsu, Chih-Che

M999 Stress Rupture
ASTM E139
Load: (1200 to 2400) lbf, (6 to 48) kN
Temperature: (100 to 1200) °C

Approval Signatory: LI, Song-Lin; Lin, Meng-Hung; Hsu, Chih-Che

■ 06. 01 Polymer and Composite Materials
Plastics and Electrical Insulating Materials Test Specimen
M023 Bend Resistance
ASTM D790 (Method A)
(1.5 to 5) kN
(337 to 1, 124) lbf

Approval Signatory: WU, Kou-Wei; LIN, Zong-Han





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06. 02 Polymer and Composite Materials
Vulcanized Rubber or Rubber Compound
M001 Durometer Hardness
ASTM D2240
Durometer Type A: (10 to 90)

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen

M002 Tension
ASTM D412
(44 to 2, 002) N
(10 to 450) lbf
Specimen Type: O ring type, Dumbell Type

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen

M018 Tearing Strength
ASTM D624
(44 to 2, 002) N
(10 to 450) lbf
Specimen Type: DIE C, DIE B

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen

M021 Ageing Test
ASTM D573
Tension, Ultimate Elongation
Temperature: (70 to 248) °C

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen

M033 Immersion
ASTM D471
Temperature:
Room Temperature to 300 °C
Immersion type: ASTM No.1, No.2, No.3, No.4, Fuel A, B, C, D, JP 4, 8, 10, Mil-H-5606, Mil-H-6083, Mil-H-7808, Mil-H-83282, Brake oil, Water

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen



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M036 Vulcanization Rate
ASTM D2084
Temperature: (100 to 245) °C
Vulcanized: (0 to 1000) min
Torque: 200 lbf·in Max.

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen

M038 Compression Set
ASTM D395 (Method B)
Temperature: Room Temperature to 300 °C
Compression: 25 %

Approval Signatory: SHEN, Bei-Huw; LIN, Jenn-Song; WONG, Jhin-Wei; CHANG, Jia-Huang; HSIEH, Wen-Yen

■ 06. 99 Polymer and Composite Materials
Polymer Matrix Composite Materials Test Specimen
M002 Tension
ASTM D3039
(15 to 144) kN
(3, 370 to 32, 360) lbf

Approval Signatory: WU, Kou-Wei; LIN, Zong-Han

M003 Compression
ASTM D3410
(15 to 144) kN
(3, 370 to 32, 360) lbf

Approval Signatory: WU, Kou-Wei; LIN, Zong-Han

M999 In-plane Shear Test
ASTM D3518
(15 to 144) kN
(3, 370 to 32, 360) lbf

Approval Signatory: WU, Kou-Wei; LIN, Zong-Han

(Null below)

