



Monday Jan-12-2015

**From:**

Cameron Canada Corporation  
3707 97 St.

Edmonton, Alberta, Canada  
T6E 6J2  
780-468-2732

[www.c-a-m.com](http://www.c-a-m.com)

**To:**

..

**Subject:**

Serial: 120420957

Quantity/Series: 25

**Comment:**

**Part Number:** 5A-T3F05S20LZ3

**Description:** BV F05 FNPT NUTRON T3 2000 WOG SOUR LT

**Sales Order:** N/A

**Purchase Order:** N/A



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## Document Summary Page

The MTR's are printed in the following order:

| # | Heat #     | Heat Code | Part Description                         | Product           |
|---|------------|-----------|------------------------------------------|-------------------|
| 1 | L          | LOC       | Nutron T3, B3, B2, TT Sour Low Temp.     | --LOC             |
| 2 | Hydro Test | 598       | API 598                                  | -Hydro Test       |
| 3 | D105D945   |           | BODY, 1/2" 6000 WOG T3                   | 5A-10000532600    |
| 4 | 342375     |           | BODY, 1/2" 6000 WOG T3                   | 5A-10000532600    |
| 5 | HN86       |           | CAP,1/2" FP 4000 WOG FNPT,ASTM A350 GR   | 5A-1020100531400  |
| 6 | Z93D770    |           | CAP,1/2" FP 4000 WOG FNPT,ASTM A350 GR   | 5A-1020100531400  |
| 7 | R6171      |           | STEM,1/2",ANTI-STATIC, ASTM A564 17-4    | 5A-11300513617001 |
| 8 | S8254      |           | BALL,1/2",MODEL T3/B3E,ASTM A479 (LATEST | 5A-11500510617015 |



**VALVES & MEASUREMENT**  
Cameron Canada Corporation  
3707 - 97 Street  
Edmonton Alberta Canada T6E 6J2  
Phone 780.463.6868  
Fax 780.465.1244  
www.c-a-m.com

## **GENERAL LETTER OF COMPLIANCE**

**for:**

**Nutron Models  
T3, B3 & B2 & TT**

**Style 'L': Sour Low Temperature Service**

Cameron Valves & Measurement hereby certifies that the design, fabrication, testing and quality control of the above NUTRON brand ball valves for Sour Low Temperature Service have been made in accordance with the following applicable standards (latest edition in effect at time of manufacture): API 598 (1-1/2" and smaller), API 6D (TT only), ASME B16.34, CSA Z245.15 Sour Service (2" FP and larger) and V&M Engineering Standards. As part of compliance to these specifications, the valves have been marked in accordance with MSS SP-25. The valve has also been marked "SOUR" as required by CSA Z245.15 marking requirements for Sour Service.

The materials of construction for this valve conform to the metallurgical requirements of NACE MR0175/ISO 15156:2009 (Parts 1 & 2 for Carbon & Alloy Steels in SSC Region 3 Sour Service and Parts 1 & 3 for CRA's as specified in CSA Z245.15 Chapter 13). Per NACE MR0175-2009/ISO 15156, it is the customer's/user's responsibility to ensure that the valve materials will be satisfactory in the intended service.

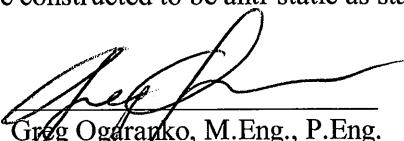
The minimum service temperature of these valves is -46°C/-50°F. Impact testing has been performed in accordance with applicable ASTM requirements and those of CSA Z245.15 for Category II M45C Service.

The 'Z' option code designation at the end of a figure number indicates that the valve meets the requirements of API-607 Fourth Edition, May 1993.

These valves (1-1/2" and larger) conform to the Pressure Equipment Directive requirements and are marked as CE certified (Certificate #8888-001-2002).

The B2 and TT valve models are constructed to be anti-static as standard.

Approved by:

  
Greg Ogarko, M.Eng., P.Eng.  
Engineering Manager

**VALVES & MEASUREMENT**

Cameron Canada Corporation  
3707-97th St.  
Edmonton Alberta Canada T6E 6J2  
Phone 780.468.2732  
www.c-a-m.com

**CERTIFICATE OF CONFORMANCE****API 598 Pressure Testing – Carbon Steel  
(2" RP and Smaller)**

**COMPLIANCE:** These valves are tested in accordance with Cameron Valves & Measurement's standard procedures and API Standard 598, as per the chart below.

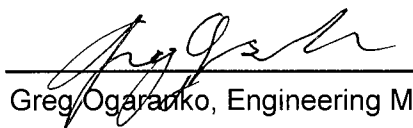
Test durations are 15 seconds in length as a minimum. Test duration is defined as the period of inspection after the valve is fully prepared and is under full pressure.

Butt weld end valves shall be tested in accordance with the ANSI rating.

Actual test pressure is rounded to next highest increment on the gauge.

**Carbon Steel**  
**Shell and Seat Test Pressures**  
*(Table Based on Rating for Group 1.1 Materials per ANSI B16.34)*

| Valve Class | Maximum Working Pressure | Hydrostatic Shell Test Pressure (PSI) | Air Seat Test Pressure +/- 10 PSI |
|-------------|--------------------------|---------------------------------------|-----------------------------------|
| 150 ANSI    | 285                      | 450                                   | 80                                |
| 300 ANSI    | 740                      | 1125                                  | 80                                |
| 600 ANSI    | 1480                     | 2225                                  | 80                                |
| 800 ANSI    | 1975                     | 3000                                  | 80                                |
| 900 ANSI    | 2220                     | 3350                                  | 80                                |
| 1500 ANSI   | 3705                     | 5575                                  | 80                                |
| 2500 ANSI   | 6170                     | 9275                                  | 80                                |
| 275 WOG     | 275                      | 425                                   | 80                                |
| 720 WOG     | 720                      | 1100                                  | 80                                |
| 1000 WOG    | 1000                     | 1500                                  | 80                                |
| 1440 WOG    | 1440                     | 2175                                  | 80                                |
| 1500 WOG    | 1500                     | 2250                                  | 80                                |
| 2000 WOG    | 2000                     | 3000                                  | 80                                |
| 2160 WOG    | 2160                     | 3250                                  | 80                                |
| 3000 WOG    | 3000                     | 4500                                  | 80                                |
| 3600 WOG    | 3600                     | 5400                                  | 80                                |
| 4000 WOG    | 4000                     | 6000                                  | 80                                |
| 5000 WOG    | 5000                     | 7500                                  | 80                                |
| 6000 WOG    | 6000                     | 9000                                  | 80                                |

  
Greg Ogarko, Engineering Manager

**Campex Inc.**

Rev. 02

## CHEMICAL COMPOSITION

# MECHANICAL PROPERTY TEST REPORT

CHECKED BY: LIU NING

APPROVED BY: ZHANG ZENGKUI

REPORTED DATE: NOVEMBER 6, 2014

[illegible]

**Mechanical Property testing performed after heat treatment using standard round 2" specimen.**

Testing performed by Shandong Molong Petroleum Machinery Co., Ltd



## MTR COVER SHEET

Company: ZINTRON INDUSTRIAL LTD  
Address: No.198-1, Sinhe Rd, Hsin Feng Hsiang,Hsinchu, Taiwan, R.O.C.  
  
Phone: 886-3-568-7100  
Fax: Line 1: 886-3-568-7119  
E-Mail: zintron@zintron.com.tw

|              |                                                                     |             |                                                      |       |            |
|--------------|---------------------------------------------------------------------|-------------|------------------------------------------------------|-------|------------|
| Date:        | 2014/8/8                                                            |             |                                                      |       |            |
| Customer :   | CAM DISTRIBUTED VAL EDMONTON                                        |             |                                                      |       |            |
| Address:     | COOPER CAMERON CANADA CORP 3707-97 Street Edmonton, Alberta T6E 6J2 |             |                                                      |       |            |
| Customer PO: | 4510387974                                                          | Item No.    | 90                                                   | Date: | 2014/10/17 |
| Part No.     | 5A-10000532600 REV 02                                               | Part Desc.: | BODY,1/2" 6000 WOG,ASTM A350 (LATEST EDITION) Gr LF2 |       |            |
| Heat No.     | 342375_,332270_..                                                   | Heat Code:  |                                                      |       |            |

|           |  |           |  |       |  |
|-----------|--|-----------|--|-------|--|
| S.O.No.:  |  | Item No.: |  | Date: |  |
| Quantity: |  | Weight:   |  |       |  |

We hereby certifies that the parts shipped on your purchase order specified above have been produced in accordance with purchase order instructions and specification.

APPROVED BY: Martin  
Authorized Signature: QA Manager: Martin Chu  
Print Name: Martin Chu  
Title: QA Manager

### Original MTR/Certification provided by(attached):

Supplier: ZINTRON INDUSTRIAL LTD  
Address: No.198-1, Sinhe Rd, Hsin Feng Hsiang,Hsinchu, Taiwan, R.O.C.  
  
Phone: 886-3-568-7100  
Fax: Line 1: 886-3-568-7119  
E-Mail: zintron@zintron.com.tw

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**Note: MTR/Certification shall be legible for electronic archiving.**



# MTR HEAT NUMBER ANNEX FORM

**Part Number:** 5A-10000532600 REV 02

**PO: 4510387974-90**

**Quantity: 4500**

[illegible]

**APPROVED**

**By laia at 11:21 am, 10/23/14**



# Zintron Industrial LTD

No.198-1, Sinhe Rd., Sinfong Township, Hsinchu County 304, Taiwan (R.O.C.)  
 Tel : 886-3-568-7100  
 Fax : 886-3-568-7119  
 E-mail : zintron@zintron.com.tw

[T3-1/2"B 6000 WOG,ASTM A350 LF2]

Report No: 2324-221

## MILL TEST CERTIFICATE REPORT

|            |                                                      |               |               |
|------------|------------------------------------------------------|---------------|---------------|
| Client     | Cooper Cameron Valves Canada                         | Shipping Date | Aug.08.2014   |
| Product    | BODY,1/2" 6000 WOG,ASTM A350 (LATEST EDITION) Gr LF2 | Material      | ASTM A350 LF2 |
| Order No   | 4510387974-90                                        | Condition     | forge         |
| Part No    | 5A-10000532600 REV 02                                |               |               |
| Order Q'ty | 4500 pcs                                             | Shipping Q'ty | 4500 pcs      |

### CHEMICAL PROPERTIES

| Material Spec.     | Chemical Composition % |       |       |       |       |       |       |       |       |       |       |       |         |       |       |  |
|--------------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|--|
|                    |                        | C     | Si    | Mn    | P     | S     | Ni    | Cr    | Mo    | Cu    | V     | Cb    | Residue | C.E.  | Cr+Mo |  |
|                    | Max.                   | 0.210 | 0.300 | 1.350 | 0.030 | 0.030 | 0.400 | 0.300 | 0.120 | 0.400 | 0.050 | 0.020 | 1.000   | 0.430 | 0.320 |  |
|                    | Min.                   |       | 0.150 | 0.600 |       |       |       |       |       |       |       |       |         |       |       |  |
| Heat No: 342375_   |                        | 0.190 | 0.200 | 0.840 | 0.014 | 0.011 | 0.070 | 0.090 | 0.020 | 0.190 | 0.003 | 0.002 | 0.373   | 0.370 | 0.110 |  |
| Heat No: 332270_.. |                        | 0.190 | 0.210 | 0.840 | 0.018 | 0.004 | 0.050 | 0.110 | 0.010 | 0.140 | 0.002 | 0.001 | 0.312   | 0.370 | 0.120 |  |

### MECHANICAL PROPERTIES

| Material Spec.     |      | Tensile Strength | Yield Strength | Elong.% | R.A.%  | Hardness1 | Hardness2 |  |  |
|--------------------|------|------------------|----------------|---------|--------|-----------|-----------|--|--|
|                    | Max. | 95000 psi        |                |         |        | 197 HB    | 197 HB    |  |  |
|                    | Min. | 70000 psi        | 36000 psi      | 22 %    | 30 %   | 143 HB    | 143 HB    |  |  |
| Heat No: 342375_   |      | 77373 psi        | 49098 psi      | 34 %    | 73 %   | 170 HB    | 179 HB    |  |  |
| Heat No: 332270_.. |      | 76790 psi        | 50108 psi      | 37 %    | 73.4 % | 143 HB    | 149 HB    |  |  |

### Charpy V-Notch Impact Test for Standard Size 10x10mm Specimen

| Material Spec.     | -46°C V-Notch Impact | Impact No.1  | Impact No.2  | Impact No.3   |  |  |
|--------------------|----------------------|--------------|--------------|---------------|--|--|
| Heat No: 342375_   | 55.55 ft-lbs         | 73.66 ft-lbs | 67.28 ft-lbs | 25.72 ft-lbs  |  |  |
| Heat No: 332270_.. | 67.17 ft-lbs         | 56.83 ft-lbs | 40.74 ft-lbs | 103.93 ft-lbs |  |  |

### Heat Treatment Procedure as follows:

1. Austenitize at 1550-1700°F(843-930°C). Cycle time shall be one hour minimum.
2. Oil quench.
3. Temper at 1100-1300°F(590-704°C),holding at temperature a minimum of 30 min/in.(30min/25mm) of maximum thickness but in no case less than 30 min.
4. Air cool.

- 1.The material specification followed MS-021009-01-03 REV.16
- 2.C.E.= %C+%Mn/6 + (%Cr+%Mo + %V)/5 +(%Ni+%Cu)/15
- 3.The Charpy V-notch impact test was implemented as below:  
 (1)Specimen Size :ASTM E23 10 mm x 10 mm x 55 mm V-Notch  
 (2)The test specimen orientation: longitudinal.

We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and that inspections were performed and certificates issued in accordance with EN 10204, 3.1, 2004.

APPROVED BY:

*Martin*

QA Manager: Martin Chu

**APPROVED**

By laia at 11:23 am, 10/23/14



Global  
 ISO 9001:2008  
 Registration Number: 69Q15438

## HEAT TREATMENT ANNEX FORM

[illegible]

**APPROVED**

**By laia at 11:23 am, 10/23/14**



無放射性污染暨品質證明書  
(出廠證明書)  
TEST CERTIFICATE

OFFICE : 臺中市后里區中后路702號  
702, CHIAHOU ROAD, HOU LI SHIUNG,  
TAICHUNG HSIEN, TAIWAN, ROC  
TEL : (04)25565101  
FAX : (04)25566955

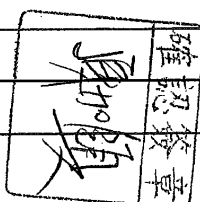
|                       |                                        |                             |                         |
|-----------------------|----------------------------------------|-----------------------------|-------------------------|
| 客戶名稱<br>CUSTOMER NAME |                                        | 證明書編號<br>CERTIFICATE NO.    | 234B0388-001            |
| 規格名稱<br>SPEC.         | ASTM A105                              | 交運日期<br>SHIPPING DATE       | 2014/04/18 ~ 2014/04/18 |
| 產品名稱<br>PRODUCT       | HOT ROLLED STRAIGHT ROUND BAR<br>熱軋直棒鋼 | 證明書列印日期<br>CERTIFICATE DATE | 2014/04/21              |

| 尺寸及規格 MATERIAL DESCRIP.     |                   |                     |                      |               | 拉力試驗 TENSILE                             |                              |              |      | 化學成分(%)CHEMICAL ANALYSIS |       |       |       |       |       |       |       |        |           |     |   |   | 重量單<br>編號<br>SHIPPING NO. |  |
|-----------------------------|-------------------|---------------------|----------------------|---------------|------------------------------------------|------------------------------|--------------|------|--------------------------|-------|-------|-------|-------|-------|-------|-------|--------|-----------|-----|---|---|---------------------------|--|
| 直徑<br>DIA.<br>(mm)          | 長度<br>LEN.<br>(m) | 數量<br>QTY<br>(bdl.) | 重量<br>WEIGHT<br>(kg) | 爐號<br>HEAT NO | 降伏<br>Y <sub>P</sub><br>/mm <sup>2</sup> | 抗拉<br>TS<br>/mm <sup>2</sup> | 伸長率<br>EL(%) |      |                          |       |       |       |       |       |       |       |        |           |     |   | B | CO                        |  |
|                             |                   |                     |                      |               |                                          |                              |              | C    | Si                       | Mn    | P     | S     | Ni    | Cr    | Mo    | Cu    | Pb     | Al        | Nb  | V |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              | X100 | X1000                    | X1000 | X1000 | X1000 | X1000 | X1000 | X1000 | X1000 | X10000 | X1000     |     |   |   |                           |  |
| 50                          | 6                 | 3                   | 5595                 | 342375        |                                          |                              |              | 18   | 15                       | 80    | 30    | 30    | 40    | 30    | 12    | 40    |        | 20        | 30  |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              | 20   | 30                       | 100   | MAX   | MAX   | MAX   | MAX   | MAX   | MAX   |        | MAX       | MAX |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              | 19   | 20                       | 84    | 14    | 11    | 7     | 9     | 2     | 19    | 0      | 2         | 3   |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        | 3         | 1   |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        | 2D3418023 |     |   |   |                           |  |
| TOTAL: 3 BUNDLES 5,595 kgs. |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
| REMARK:                     |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |
|                             |                   |                     |                      |               |                                          |                              |              |      |                          |       |       |       |       |       |       |       |        |           |     |   |   |                           |  |

※茲證明本表所列產品,均係材料規格製造及試驗並符合規格之要求  
WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS MANUFACTURED AND TESTED WITH  
SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENT OF THE ABOVE MATERIAL SPECIFICATION.

冶金研發處處長  
MANAGER  
METALLURGICAL R&D DEP.

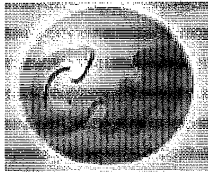
郭志毅



ISO 9001:2008  
ID: 5M8Y004

APPROVED

By laia at 11:24 am, 10/23/14



# Giant Young Machinery Component Parts Co., Ltd.

No. 13 Fang Yuan Ind. Park 4 th Rd. , Chang Hwa Hsien , Taiwan

TEL: 886-4-8965977

FAX: 886-4-8965981

## 機械性質測試證明 MECHANICAL PROPERTIES CERTIFICATE

材質 (Material): ASTM A350 LF2 報告編號 (Report No): GF20141013037  
數量 (Quantity): 1PC 訂單號碼 (Order No): GF1031013  
日期 (Date): OCT.13.2014 試片 (Specimen): Forged Specimen

### 拉伸試驗 Tension Test

| Heat No. | 試片<br>Test specimen     |                   | 抗拉強度<br>T.S            | 降伏強度<br>Y.S                        | 伸長率<br>Elongation | 斷面縮率<br>R.A | 硬度值 1<br>Hardness<br>勃氏硬度 | 硬度值 2<br>Hardness<br>勃氏硬度 |
|----------|-------------------------|-------------------|------------------------|------------------------------------|-------------------|-------------|---------------------------|---------------------------|
|          | 標點長(mm)<br>Gauge Length | 直徑<br>(mm)<br>Dia | kgf/mm <sup>2</sup>    | 0.2% offset<br>kgf/mm <sup>2</sup> | %                 | %           | Brinell<br>HB             | Brinell<br>HB             |
| 342375   | 25                      | 6.20              | 54.40<br>( 77373 psi ) | 34.52<br>( 49098 psi )             | 34                | 73          | 170                       | 179                       |
|          |                         |                   |                        |                                    |                   |             |                           |                           |
|          |                         |                   |                        |                                    |                   |             |                           |                           |
|          |                         |                   |                        |                                    |                   |             |                           |                           |
|          |                         |                   |                        |                                    |                   |             |                           |                           |
|          |                         |                   |                        |                                    |                   |             |                           |                           |
|          |                         |                   |                        |                                    |                   |             |                           |                           |

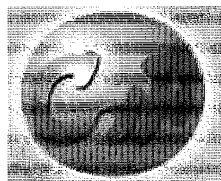
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Q.A.CHIEF:

陳加鎮

**APPROVED**

By laia at 11:25 am, 10/23/14



# Giant Young Machinery Component Parts Co., Ltd.

No. 13 Fang Yuan Ind. Park 4 th Rd. , Chang Hwa Hsien , Taiwan

TEL: 886-4-8965977

FAX: 886-4-8965981

## 衝擊試驗報告表 IMPACT TEST REPORT

客戶:

品名:

檢驗編號:

Customer: Cameron International Corporation Product: Forged specimen Application No: GF20141013003

委託事項:

衝擊試驗

材質:

檢驗日期:

Job Description: Impact Testing

Material: ASTM A350 LF2

Date Issued: Oct.13,2014

1. Testing specification: ASTM A-350 LF2
2. Testing Instrument: Impact Tester
3. Specimen Size :ASTM E23 10 mm x 10 mm x 55 mm V-Notch
4. Testing Temperature: - 50<sup>0</sup> F
5. The test specimen orientation:longitudinal

### Testing Result:

| 試片編號<br>Specimen No | 衝擊值<br>Energy Value (Ft-Lbs ) |       |       | 平均值<br>Average<br>Value( Ft-Lbs ) | 備註<br>Remark |
|---------------------|-------------------------------|-------|-------|-----------------------------------|--------------|
|                     | No. 1                         | No. 2 | No. 3 |                                   |              |
| 342375              | 73.66                         | 67.28 | 25.72 | 55.55Ft-Lbs                       |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |

Q.A.CHIEF: 陳加鎮

**APPROVED**

By laia at 11:25 am, 10/23/14

**豐興鋼鐵股份有限公司**  
FENG HSIANG IRON & STEEL CO., LTD.

**品質證明書**  
(出廠證明書)  
TEST CERTIFICATE

OFFICE : 臺中縣后里鄉豐后路702號  
702, CAILANG ROAD, HOU LI TOWNSHIP,  
TAICHUNG M.S.I.E.N, TAIWAN, R.O.C.  
TEL : (04)25565101  
FAX : (04)25566535

|                       |           |  |                 |                             |                          |              |
|-----------------------|-----------|--|-----------------|-----------------------------|--------------------------|--------------|
| 客戶名稱<br>CUSTOMER NAME | ASTM A105 |  | 產品名稱<br>PRODUCT | 熱軋直棒鋼                       | 證明書編號<br>CERTIFICATE NO. | 21BP0460-001 |
| 規格名稱<br>SPEC.         | ASTM A105 |  | 產品名稱<br>PRODUCT | 熱軋直棒鋼                       | 交運日期<br>SHIPPING DATE    | 2012/11/18   |
|                       |           |  |                 | 證明書列印日期<br>CERTIFICATE DATE | 2012/11/27               |              |

| 尺寸及規格<br>DIM. (mm) | 長度<br>LEN. (m) | 數量<br>QTY (bdl.) | 重量<br>WEIGHT (kg) | 爐號<br>HEAT NO | 機械性能<br>MECHANICAL |                | 化學成分(%)<br>CHEMICAL ANALYSIS |    |     |     |     |     |     |     |     |    |     |     |   |           |  | 重量<br>早<br>編號<br>SHIPPING<br>NO. |
|--------------------|----------------|------------------|-------------------|---------------|--------------------|----------------|------------------------------|----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|---|-----------|--|----------------------------------|
|                    |                |                  |                   |               | 屈服強度<br>YIELD ST.  | 伸長率<br>EL. (%) | C                            | SI | Mn  | P   | S   | NI  | Cr  | Mo  | CU  | PB | AL  | NB  | V | B         |  |                                  |
| 38                 | 6              | 4                | 7488              | 332270        |                    |                | 18                           | 15 | 80  | 30  | 30  | 40  | 30  | 12  | 40  |    | 20  | 30  |   | 201B18062 |  |                                  |
|                    |                |                  |                   |               |                    |                | 20                           | 30 | 100 | MAX | MAX | MAX | MAX | MAX | MAX |    | MAX | MAX |   |           |  |                                  |
|                    |                |                  |                   |               |                    |                | 19                           | 21 | 84  | 18  | 4   | 5   | 11  | 1   | 14  |    | 1   | 2   | 2 |           |  |                                  |

ISO 9001

BSI

REGISTERED

認可商標

330 9001

ID: 5M8Y

確信

4 BUNDLES

7,488 kgs.

TOTAL:

REMARK:

TOTAL: 4 BUNDLES 7,488 kgs.

2540 LIT

USB-4FF4F2

茲證明本表所列產品均按材料規格製造及檢驗並符合規格之要求  
WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS MANUFACTURED AND TESTED WITH  
SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENT OF THE ABOVE MATERIAL SPECIFICATION.

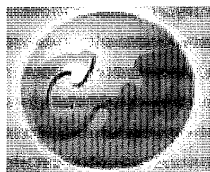
冶金研發處長  
MANAGER  
METALLURGICAL R&D DEP.

郭志毅

ISO 9001 : 2008  
ID : 5MSY004

確認簽章  
10/25

**APPROVED**  
By laia at 11:26 am, 10/23/14



# Giant Young Machinery Component Parts Co., Ltd.

No. 13 Fang Yuan Ind. Park 4 th Rd. , Chang Hwa Hsien , Taiwan

TEL: 886-4-8965977

FAX: 886-4-8965981

## 機械性質測試證明 MECHANICAL PROPERTIES CERTIFICATE

材質 (Material): ASTM A350 LF2 報告編號 (Report No): GF20141013041  
數量 (Quantity): 1PC 訂單號碼 (Order No): GF1031013  
日期 (Date): OCT.13.2014 試片 (Specimen): Forged Specimen

| 拉 伸 試 驗 Tension Test |                         |                   |                        |                                    |                   |             |                           |                           |
|----------------------|-------------------------|-------------------|------------------------|------------------------------------|-------------------|-------------|---------------------------|---------------------------|
| Heat No.             | 試 片<br>Test specimen    |                   | 抗拉強度<br>T.S            | 降伏強度<br>Y.S                        | 伸長率<br>Elongation | 斷面縮率<br>R.A | 硬度值 1<br>Hardness<br>勃氏硬度 | 硬度值 2<br>Hardness<br>勃氏硬度 |
|                      | 標點長(mm)<br>Gauge Length | 直徑<br>(mm)<br>Dia | kgf/mm <sup>2</sup>    | 0.2% offset<br>kgf/mm <sup>2</sup> | %                 | %           | Brinell<br>HB             | Brinell<br>HB             |
| 332270               | 25                      | 6.22              | 53.99<br>( 76790 psi ) | 35.23<br>( 50108 psi )             | 37                | 73.4        | 143                       | 149                       |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |

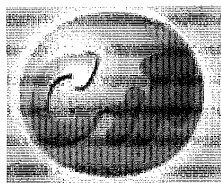
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B L A N K

Q.A.CHIEF:

陳加鎮

**APPROVED**

By laia at 11:26 am, 10/23/14



# Giant Young Machinery Component Parts Co., Ltd.

No. 13 Fang Yuan Ind. Park 4 th Rd. , Chang Hwa Hsien , Taiwan

TEL: 886-4-8965977

FAX: 886-4-8965981

## 衝 擊 試 驗 報 告 表 IMPACT TEST REPORT

客 戶:

品 名:

檢驗編號:

Customer: Cameron International Corporation Product: Forged specimen Application No: GF20141013007

委託事項:

衝擊試驗

材 質:

檢驗日期:

Job Description: Impact Testing

Material: ASTM A350 LF2

Date Issued: Oct.13,2014

1. Testing specification: ASTM A-350 LF2
2. Testing Instrument: Impact Tester
3. Specimen Size :ASTM E23 10 mm x 10 mm x 55 mm V-Notch
4. Testing Temperature: - 50<sup>0</sup> F
5. The test specimen orientation:longitudinal

### Testing Result:

| 試片編號<br>Specimen No | 衝 擊 值<br>Energy Value (Ft-Lbs ) |       |        | 平均值<br>Average<br>Value( Ft-Lbs ) | 備註<br>Remark |
|---------------------|---------------------------------|-------|--------|-----------------------------------|--------------|
|                     | No. 1                           | No. 2 | No. 3  |                                   |              |
| 332270              | 56.83                           | 40.74 | 103.93 | 67.17Ft-Lbs                       |              |
|                     |                                 |       |        |                                   |              |
|                     |                                 |       |        |                                   |              |
|                     |                                 |       |        |                                   |              |
|                     |                                 |       |        |                                   |              |
|                     |                                 |       |        |                                   |              |

Q.A.CHIEF:

陳加鎮

**APPROVED**

By laia at 11:31 am, 10/23/14

## MTR COVER SHEET

Company: ZINTRON INDUSTRIAL LTD

Address: No.198-1, Sinhe Rd, Hsin Feng Hsiang, Hsinchu, Taiwan, R.O.C.

Phone: 886-3-568-7100

Fax: Line 1: 886-3-568-7119

E-Mail: zintron@zintron.com.tw

|              |                                                                     |             |                                 |
|--------------|---------------------------------------------------------------------|-------------|---------------------------------|
| Date:        | 2014/8/22                                                           |             |                                 |
| Customer :   | CAM DISTRIBUTED VAL EDMONTON                                        |             |                                 |
| Address:     | COOPER CAMERON CANADA CORP 3707-97 Street Edmonton, Alberta T6E 6J2 |             |                                 |
| Customer PO: | 4510387974                                                          | Item No.    | 50                              |
| Part No.     | 5A-1020100531400 Rev.03                                             | Part Desc.: | CAP, 1/2" FP 4000 WOG FNPT, LF2 |
| Heat No.     | HN86_                                                               | Heat Code:  |                                 |

|           |  |           |  |       |  |
|-----------|--|-----------|--|-------|--|
| S.O.No.:  |  | Item No.: |  | Date: |  |
| Quantity: |  | Weight:   |  |       |  |

We hereby certifies that the parts shipped on your purchase order specified above have been produced in accordance with purchase order instructions and specification.

APPROVED BY: Martin  
Authorized Signature: QA Manager: Martin Chu  
Print Name: Martin Chu  
Title: QA Manager

**Original MTR/Certification provided by(attached):**

Supplier: ZINTRON INDUSTRIAL LTD

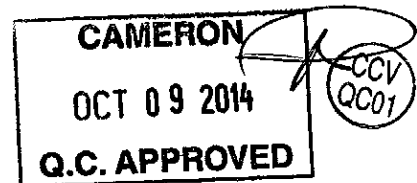
Address: No.198-1, Sinhe Rd, Hsin Feng Hsiang, Hsinchu, Taiwan, R.O.C.

Phone: 886-3-568-7100

Fax: Line 1: 886-3-568-7119

E-Mail: zintron@zintron.com.tw

217



**Note: MTR/Certification shall be legible for electronic archiving.**



# Zintron Industrial LTD

No.198-1, Sinhe Rd., Sinfong Township, Hsinchu County 304, Taiwan (R.O.C.)  
 Tel : 886-3-568-7100  
 Fax : 886-3-568-7119  
 E-mail : zintron@zintron.com.tw

[T3-1/2" F FNPT 4000 LF2]

Report No: 2535-217

## MILL TEST CERTIFICATE REPORT

|            |                                 |               |               |
|------------|---------------------------------|---------------|---------------|
| Client     | Cooper Cameron Valves Canada    | Shipping Date | Aug.22.2014   |
| Product    | CAP, 1/2" FP 4000 WOG FNPT, LF2 | Material      | ASTM A350 LF2 |
| Order No   | 4510387974-50                   | Condition     | Forge         |
| Part No    | 5A-1020100531400 Rev.03         |               |               |
| Order Q'ty | 5500 pcs                        | Shipping Q'ty | 5500 pcs      |

### CHEMICAL PROPERTIES

| Material Spec. | Chemical Composition % |       |       |       |       |       |       |       |       |       |       |       |         |       |       |
|----------------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|-------|-------|
|                |                        | C     | Si    | Mn    | P     | S     | Ni    | Cr    | Mo    | Cu    | V     | Cb    | Residue | C.E.  | Cr+Mo |
|                | Max.                   | 0.210 | 0.300 | 1.350 | 0.030 | 0.030 | 0.400 | 0.300 | 0.120 | 0.400 | 0.050 | 0.020 | 1.000   | 0.430 | 0.320 |
|                | Min.                   |       | 0.150 | 0.600 |       |       |       |       |       |       |       |       |         |       |       |
| Heat No: HN86  |                        | 0.180 | 0.180 | 0.830 | 0.013 | 0.009 | 0.040 | 0.070 | 0.010 | 0.110 | 0.002 | 0.001 | 0.232   | 0.340 | 0.080 |

### MECHANICAL PROPERTIES

| Material Spec. |      | Tensile Strength | Yield Strength | Elong.% | R.A.%  | Hardness1 | Hardness2 |  |  |
|----------------|------|------------------|----------------|---------|--------|-----------|-----------|--|--|
|                | Max. | 95000 psi        |                |         |        | 197 HB    | 197 HB    |  |  |
|                | Min. | 70000 psi        | 36000 psi      | 22 %    | 30 %   | 143 HB    | 143 HB    |  |  |
| Heat No: HN86  |      | 78070 psi        | 50947 psi      | 35.8 %  | 72.9 % | 146 HB    | 148 HB    |  |  |

### Charpy V-Notch Impact Test for Standard Size 10x10mm Specimen

| Material Spec. | -46°C V-Notch Impact | Impact No.1  | Impact No.2  | Impact No.3  |  |  |
|----------------|----------------------|--------------|--------------|--------------|--|--|
| Heat No HN86   | 63.85 ft/lbs         | 67.28 ft/lbs | 71.53 ft/lbs | 52.73 ft/lbs |  |  |

### Heat Treatment Procedure as follows:

1. Austenitize at 1550-1700°F(843-930°C), Cycle time shall be one hour minimum.
2. Oil quench.
3. Temper at 1100-1300°F(590-704°C), holding at temperature a minimum of 30 min/in.(30min/25mm) of maximum thickness but in no case less than 30 min.
4. Air cool.

- 1.The material specification followed MS-021034-01-02 REV.02.
- 2.C.E =  $\frac{\%C + \%Mn}{6} + \frac{(\%Cr + \%Mo + \%V)}{5} + \frac{(\%Ni + \%Cu)}{15}$
- 3.The Charpy V-notch impact test was implemented as below:  
 (1) Specimen Size :ASTM E23 10 mm x 10 mm x 55 mm V-Notch  
 (2) The test specimen orientation: longitudinal.



We hereby certify that the material provided complies with all CVM requirements as stated in the applicable purchase order and that inspections were performed and certificates issued in accordance with EN 10204, 3.1, 2004.

APPROVED BY: Martin  
**QA Manager: Martin Chu**



## HEAT TREATMENT ANNEX FORM

[illegible]



無放射性污染暨品質證明書  
(出廠證明書)  
TEST CERTIFICATE

OFFICE : 臺中市后里區平厝路702號.  
702, CHIAKOU ROAD, HOU LI SHUNG,  
TAICHUNG HSIEN, TAIWAN, ROC  
TEL : (04)25565101  
FAX : (04)25568955

|                       |           |                                        |                             |                         |
|-----------------------|-----------|----------------------------------------|-----------------------------|-------------------------|
| 客户名称<br>CUSTOMER NAME | 86372943  |                                        | 证明書編號<br>CERTIFICATE NO.    | 231B0284-001            |
| 規格名稱<br>SPEC.         | ASTM A105 | 產品名稱<br>PRODUCT                        | 交運日期<br>SHIPPING DATE       | 2014/01/09 ~ 2014/01/09 |
|                       |           | HOT ROLLED STRAIGHT ROUND BAR<br>熱軋直棒鋼 | 證明書列印日期<br>CERTIFICATE DATE | 2014/01/14              |

[illegible]

※茲證明本廠所生產之各種材料均係材料精良及試驗並符合規格之要求  
WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS MANUFACTURED AND TESTED WITH  
SATISFACTORY RESULTS IN ACCORDANCE WITH THE REQUIREMENT OF THE ABOVE MATERIAL SPECIFICATION

**冶金研究所 所长**  
**MANAGER**  
**METALLURGICAL R&D DEP**

鄧志毅

SC 9001 : 2008  
ID : 5M8Y004

此可獲致  
其後各人及此

SD-900  
ES-Style

確認簽章



# Giant Young Machinery Component Parts Co., Ltd.

No. 13 Fang Yuan Ind. Park 4 th Rd. , Chang Hwa Hsien , Taiwan -

TEL: 886-4-8965977

FAX: 886-4-8965981

## 機械性質測試證明 MECHANICAL PROPERTIES CERTIFICATE

材質 (Material): ASTM A350 LF2 報告編號 (Report No): GF20140922007

數量 (Quantity): 1PC 訂單號碼 (Order No): GF1030922

日期 (Date): SEP.22.2014 試片 (Specimen): Forged Specimen

| 拉 伸 試 驗 Tension Test |                         |                   |                        |                                    |                   |             |                           |                           |
|----------------------|-------------------------|-------------------|------------------------|------------------------------------|-------------------|-------------|---------------------------|---------------------------|
| Heat No.             | 試 片<br>Test specimen    |                   | 抗拉強度<br>T.S            | 降伏強度<br>Y.S                        | 伸長率<br>Elongation | 斷面縮率<br>R.A | 硬度值 1<br>Hardness<br>勃氏硬度 | 硬度值 2<br>Hardness<br>勃氏硬度 |
|                      | 標點長(mm)<br>Gauge Length | 直徑<br>(mm)<br>Dia | kgf/mm <sup>2</sup>    | 0.2% offset<br>kgf/mm <sup>2</sup> | %                 | %           | Brinell<br>HB             | Brinell<br>HB             |
| HN86                 | 25                      | 6.19              | 54.89<br>( 78070 psi ) | 35.82<br>( 50947 psi )             | 35.8              | 72.9        | 146                       | 148                       |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |
|                      |                         |                   |                        |                                    |                   |             |                           |                           |

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Q.A.CHIEF: 陳加鎮



# Giant Young Machinery Component Parts Co., Ltd.

No. 13 Fang Yuan Ind. Park 4 th Rd. , Chang Hwa Hsien , Taiwan \_

TEL: 886-4-8965977

FAX: 886-4-8965981

## 衝擊試驗報告表 IMPACT TEST REPORT

客戶:

Customer: Cameron International Corporation

品名:

Product: Forged Specimen

檢驗編號:

Application No: GF20140922007

委託事項:

Job Description: Impact Testing

衝擊試驗

材質:

Material: ASTM A350 LF2

檢驗日期:

Date Issued: Sep. 22, 2014

1. Testing specification: ASTM A-350 LF2
2. Testing Instrument: Impact Tester
3. Specimen Size :ASTM E23 10 mm x 10 mm x 55 mm V-Notch
4. Testing Temperature: - 50<sup>0</sup> F
5. The test specimen orientation:longitudinal

### Testing Result:

| 試片編號<br>Specimen No | 衝擊值<br>Energy Value (Ft-Lbs ) |       |       | 平均值<br>Average<br>Value( Ft-Lbs ) | 備註<br>Remark |
|---------------------|-------------------------------|-------|-------|-----------------------------------|--------------|
|                     | No. 1                         | No. 2 | No. 3 |                                   |              |
| HN86                | 67.28                         | 71.53 | 52.73 | 63.85Ft-Lbs                       |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |
|                     |                               |       |       |                                   |              |

Q.A.CHIEF:

陳加鎮





TUV ISO 9001  
No. 01 100 029186

原 璋 實 業 有 限 公 司

WON ZONE CORPORATION

3F No. 185 Chung Hwa Road Sec. 2, Chung Li City 32068, Taiwan  
32068 桃園縣中壢市中華路二段 185 號 3 樓 統一編號: 16879927  
Tel: +886-3-4341 325 Fax: +886-3-4341 525 E-mail: wonzone.taiwan@msa.hinet.net

| CERTIFICATE OF CHEMICAL ANALYSIS<br>AND MECHANICAL PROPERTIES                                                                                                                                                                                                                                                                                                                                                                                                                             |                             |               |               | CERTIFICATE NO. 140922- 1<br>DATE: 22-Sep-14         |                |                |                |                |                |                  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------|---------------|------------------------------------------------------|----------------|----------------|----------------|----------------|----------------|------------------|--|
| To. CAMERON CANADA CORPORATION<br>3707-97th Street, EDMONTON, AB T6E 6J2, CANADA                                                                                                                                                                                                                                                                                                                                                                                                          |                             |               |               |                                                      |                |                |                |                |                |                  |  |
| INVOICE NO. WZ-140922A                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                             |               |               | Your Order No.4510433136/471620/471657/500141/507022 |                |                |                |                |                |                  |  |
| MATERIAL SPECIFICATION: ASTM A-564 TYPE 630 H1150D                                                                                                                                                                                                                                                                                                                                                                                                                                        |                             |               |               |                                                      |                |                |                |                |                |                  |  |
| Q'TY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | PART NAME                   | DRAWING No.   | Heat Code     | Mechanical Properties                                |                |                |                |                |                |                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |               |               | Y.S.(KSI)                                            | T.S.(KSI)      | ELO.(%)        | HRC            | RA (%)         | ft-lbf (-75°F) |                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                             |               |               | <u>105 min</u>                                       | <u>125 min</u> | <u>16 min</u>  | <u>29~33</u>   | <u>50 min</u>  | <u>15 min</u>  |                  |  |
| 5,400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5A-11300513617001 Stem ½"   | #02039        | R6171         | 129                                                  | 137            | 21             | 32             | 69             | 89/88/91       |                  |  |
| 2,320                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5A-11301013617001 Stem 7/8" | #02040        | R6102         | 122                                                  | 140            | 21             | 32             | 70             | 90/87/89       |                  |  |
| 1,191                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5A-11301513617001 Stem 1½"  | #02038        | FO            | 127                                                  | 138            | 22             | 32             | 72             | 96/86/100      |                  |  |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5A-11301513617001 Stem 1½"  | #02038        | FD            | 124                                                  | 139            | 21             | 32             | 67             | 83/86/88       |                  |  |
| 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5A-11302013617001 Stem 2"   | #02041        | FH            | 126                                                  | 138            | 22             | 33             | 69             | 92/86/88       |                  |  |
| 1,400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5A-11500513617015 Ball 1/2" | #06076        | S8301         | 130                                                  | 143            | 22             | 32             | 66             | 83/78/76       |                  |  |
| 180                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5A-11501013617026 Ball 7/8" | #06082        | S8252         | 119                                                  | 137            | 23             | 30             | 69             | 120/105/113    |                  |  |
| 317                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 5A-11502013617015 Ball 2"   | #06080        | S8306         | 121                                                  | 135            | 20             | 32             | 71             | 72/78/80       |                  |  |
| Heat Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Chemical Composition (%)    |               |               |                                                      |                |                |                |                |                |                  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | C                           | Mn            | Si            | S                                                    | P              | Cr             | Ni             | Mo             | Cu             | Nb+Ta            |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <u>0.07max</u>              | <u>1.0max</u> | <u>1.0max</u> | <u>.030max</u>                                       | <u>.040max</u> | <u>15-17.5</u> | <u>3.0-5.0</u> | <u>0.5 max</u> | <u>3.0-5.0</u> | <u>0.15-0.45</u> |  |
| R6171                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.02                        | 0.64          | 0.49          | 0.023                                                | 0.029          | 15.04          | 4.36           | 0.19           | 3.40           | 0.23             |  |
| R6102                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.03                        | 0.64          | 0.47          | 0.018                                                | 0.030          | 15.40          | 4.27           | 0.13           | 3.46           | 0.23             |  |
| FO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.02                        | 0.63          | 0.51          | 0.023                                                | 0.029          | 15.17          | 4.32           | 0.18           | 3.40           | 0.23             |  |
| FD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.02                        | 0.62          | 0.44          | 0.023                                                | 0.031          | 15.16          | 4.39           | 0.14           | 3.51           | 0.21             |  |
| FH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.02                        | 0.64          | 0.49          | 0.023                                                | 0.029          | 15.04          | 4.36           | 0.19           | 3.40           | 0.23             |  |
| S8301                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.02                        | 0.62          | 0.44          | 0.023                                                | 0.031          | 15.16          | 4.39           | 0.14           | 3.51           | 0.21             |  |
| S8252                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.02                        | 0.72          | 0.36          | 0.024                                                | 0.023          | 15.38          | 4.67           | 0.10           | 3.30           | 0.28             |  |
| S8306                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.02                        | 0.72          | 0.36          | 0.024                                                | 0.023          | 15.38          | 4.67           | 0.10           | 3.30           | 0.28             |  |
| Solution Treatment: 1900°F for 30 Min/Inch (Minimum of 1 Hour), Fast Air Cooling to below 90°F<br>Double Aged at 1150°F for 4 hours minimum and cooled to below 90°F in air<br>Charpy Impact Test Specimens: 10*10*55mm(Longitudinal)<br>Re Orig Heat #SE0302-GF0 for R6171; #SD2215-GJ0 for R6102; #SE0082-BA2 for FO; #SD2214-G701 for FD;<br>#SE0302-GM0 for FH; #SD2214-G90 for S8301; #9SD0304-G13 for S8252; #9SD0304-GP0 for S8306<br>NOTE: CERTIFICATE ACCORDING TO EN 10204/3.1B |                             |               |               |                                                      |                |                |                |                |                |                  |  |
| QUALITY CONTROL INSPECTOR                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                             |               |               |                                                      |                | MANAGER        |                |                |                |                  |  |
| Sandy Yeh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                             |               |               |                                                      |                | Grant Hsu      |                |                |                |                  |  |

**APPROVED**

By laia at 1:07 pm, 10/15/14



tuv ISO 9001  
No. 01 100 029186

# 原 璋 實 業 有 限 公 司

## WON ZONE CORPORATION

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| CERTIFICATE OF CHEMICAL ANALYSIS<br>AND MECHANICAL PROPERTIES                    |                              |                            |                            |                              | CERTIFICATE NO. 140922- 7<br>DATE: 22-Sep-14 |                |                |                 |             |  |
|----------------------------------------------------------------------------------|------------------------------|----------------------------|----------------------------|------------------------------|----------------------------------------------|----------------|----------------|-----------------|-------------|--|
| To. CAMERON CANADA CORPORATION<br>3707-97th Street, EDMONTON, AB T6E 6J2, CANADA |                              |                            |                            |                              |                                              |                |                |                 |             |  |
| INVOICE NO. WZ-140922A                                                           |                              |                            |                            |                              | YOUR ORDER NO. 4510471657                    |                |                |                 |             |  |
| Material Specification: ASTM A479 type:316                                       |                              |                            |                            |                              | Heat Treatment: Solution Annealed            |                |                |                 |             |  |
| Q'TY                                                                             | PART NAME                    | DRAWING No.                | Heat Code                  | Mechanical Properties        |                                              |                |                |                 |             |  |
|                                                                                  |                              |                            |                            | Y.S.(Mpa)                    | T.S.(Mpa)                                    | EL.O.(%)       | RA(%)          | HB              |             |  |
| 2,980                                                                            | 5A-11500510617015 Ball ½"    | #06076                     | S8254                      | 205 min<br>236               | 515 min<br>590                               | 30 min<br>56   | 40 min<br>78   | ....<br>156     |             |  |
| Heat<br>Code                                                                     | Chemical Composition (%)     |                            |                            |                              |                                              |                |                |                 |             |  |
|                                                                                  | C                            | Mn                         | Si                         | S                            | P                                            | Cr             | Ni             | Mo              | N           |  |
| S8254                                                                            | 0.08 <sub>max</sub><br>0.029 | 2.0 <sub>max</sub><br>1.08 | 1.0 <sub>max</sub><br>0.33 | .030 <sub>max</sub><br>0.001 | .045 <sub>max</sub><br>0.034                 | 16-18<br>16.30 | 10-14<br>10.13 | 2.0-3.0<br>2.04 | ...<br>0.05 |  |
| Re: Orig Heat # 9SC0103-LE2                                                      |                              |                            |                            |                              |                                              |                |                |                 |             |  |
| NOTE: CERTIFICATE ACCORDING TO EN 10204/3.1B                                     |                              |                            |                            |                              |                                              |                |                |                 |             |  |
| QUALITY CONTROL INSPECTOR                                                        |                              |                            |                            |                              | MANAGER                                      |                |                |                 |             |  |
| Sandy Yeh                                                                        |                              |                            |                            |                              | Grant Hsu                                    |                |                |                 |             |  |

**APPROVED**

By Iaia at 3:03 pm, 10/15/14