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Ref. Certif. No.

FR 645615

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE / CERTIFICAT D'ESSAI OC

Product Produit	Lithium iron phosphate Rechargeable Battery Cell
Name and address of the applicant Nom et adresse du demandeur	**GMET Mfg Processes Co., Ltd.** No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan
Name and address of the manufacturer Nom et adresse du fabricant	**GMET Mfg Processes Co., Ltd.** No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan
Name and address of the factory Nom et adresse de l'usine Note : *When more than one factory, please report on page 2* Note : *Lorsqu'il y a plus d'une usine, veuillez utiliser la 2ème page*	**GMET Mfg Processes Co., Ltd.** No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan
Ratings and principal characteristics Valeurs nominales et caractéristiques principales	3.2V, 60Ah
Trademark (if any) Marque de fabrique (si elle existe)	GMET or GMET
Type of Manufacturer's Testing Laboratories used Type de programme du laboratoire d'essais constructeur	/
Model / Type Ref. Ref. De type	**G35145208 (IFP35/145/208)**
Additional information (if necessary may also be reported on page 2) Informations complémentaires (si nécessaire, peuvent être indiquées sur la 2ème page)	See test report Test procedure: CB/CCA
A sample of the product was tested and found to be in conformity with Un échantillon de ce produit a été essayé et a été considéré conforme à la	**PUBLICATION** **EDITION** IEC 62133:2002 (1st Edition)
As shown in the Test Report Ref. No. which forms part of this Certificate Comme indiqué dans le Rapport d'essais numéro de référence qui constitue partie de ce Certificat	BV CPS Tayouan Branch N°CB130626C12 001

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme **National de Certification**

Laboratoire Central des Industries Électriques
33, av du Général Leclerc – BP 8
FR 92266 Fontenay-aux-Roses cedex
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Date: 2013-08-08

Signature:

Jean LANZO
Certification Officer

LABORATOIRE CENTRAL DES INDUSTRIES ELECTRIQUES
S.A.S
au capital de 15.745.984€
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F-92260

Issued 2012-04 (LCIE)

Test Report issued under the responsibility of:

TEST REPORT
IEC 62133, First Edition
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications

Report Reference No.....:	CB130626C12 001
Date of issue.....:	August 7, 2013
Total number of pages	31
CB Testing Laboratory.....:	Bureau Veritas Consumer Product Services Limited, Taoyuan Branch
Address .....:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan
Applicant's name.....:	GMET Mfg Processes Co., Ltd.
Address .....:	No.50, Guangfu S. Rd., Hukou Township, Hsinchu County 303, Taiwan
Test specification:	
Standard.....:	IEC 62133: 2002 (1st Edition)
Test procedure .....:	CB/CCA
Non-standard test method……..:	N/A
Test Report Form No.....:	IEC62133A
Test Report Form(s) Originator .....:	UL International Demko A/S
Master TRF .....:	Dated 2008-02

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description .....:	Lithium iron phosphate Rechargeable Battery Cell
Trade Mark .....:	GMET or GMET
Manufacturer .....:	GMET Mfg Processes Co., Ltd.
Model/Type reference.....:	G35145208 (IFP35/145/208)
Ratings .....:	3.2V, 60Ah

Testing procedure and testing location:		
☒ **CB Testing Laboratory**:	Bureau Veritas Consumer Product Services Limited, Taoyuan Branch	
Testing location/ address.....	No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan	
☐ **Associated CB Test Laboratory:**	N/A	
Testing location/ address.....	N/A	
Tested by (name + signature)	Tomo Chen	Tomo Chen
Approved by (+ signature)	Ted Wu	
☐ Testing procedure: TMP	N/A	
Tested by (name + signature)	-	-
Approved by (+ signature)	-	-
Testing location/ address.....	-	
☐ Testing procedure: WMT	N/A	
Tested by (name + signature)	-	-
Witnessed by (+ signature).....	-	-
Approved by (+ signature)	-	-
Testing location/ address.....	-	
☐ Testing procedure: SMT	N/A	
Tested by (name + signature)	-	-
Approved by (+ signature)	-	-
Supervised by (+ signature).....	-	-
Testing location/ address.....	-	
☐ Testing procedure: RMT	N/A	
Tested by (name + signature)	-	-
Approved by (+ signature)	-	-
Supervised by (+ signature)	-	-
Testing location/ address.....	-	

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
4.2.1 Continuous low-rate charging 4.2.2 Vibration 4.2.4 Temperature cycling 4.3.2 External short circuit 4.3.3 Free fall 4.3.4 Mechanical shock (crash hazard) 4.3.5 Thermal abuse 4.3.6 Crushing of cells 4.3.7 Low pressure 4.3.9 Overcharge for lithium systems 4.3.10 Forced discharge 4.3.11 Cell protection against a high charging rate (lithium systems only)	**Bureau Veritas Consumer Product Services Limited, Taoyuan Branch** **No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan**
The load conditions used during testing: The unit is charging the empty battery cell and discharging the full charged battery cell according to its rating. Note: (1) Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of 20±5°C, using the method declared by the manufacturer. (2) Prior to charging, the battery cell shall have been discharged at 20±5°C at a constant current of 0.2 It A down to a specified final voltage.	

Summary of compliance with National Differences:

None

Copy of marking plate

Test item particulars ..... :	
Classification of installation and use ..... :	Built-in
Supply Connection..... :	Customized terminal
..... :	
..... :	
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	June 28, 2013
Date (s) of performance of tests ..... :	Jun3 28, 2013 – August 02, 2013

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

General product information:

(1) The equipment under test (EUT) model G35145208 (IFP35/145/208) is a Lithium iron phosphate Rechargeable Battery Cell.
Due to there is no designation for iron basis positive electrode according to IEC61960, so the “F” is designated the Iron (Fe) basis positive electrode for this cell.

(2) The maximum ambient temperature is specified as 45°C for Charging and 60°C for Discharging.

(3) Dimension of the battery cell: (T) 35mm by (W) 145mm by (L) 208mm.

(4) Weight: 1840g.

Test condition:

Temperature: 20±5°C
Relative humidity: 60%
Air pressure: 950 mbar

The test samples were pre-production samples without serial number.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
1	**General**		P
	Parameter measurement tolerances	Both normal and foreseeable misuses are evaluated in the report. All control and measure values were within the tolerances.	P
2	**General Safety Considerations**		P
	Cells and batteries subject to intended use be safe and continue to function in all respects	The cell is safe and continues to function in all respects under the condition of intended use.	P
	Cells and batteries subject to reasonably foreseeable misuse do not present significant hazards.	The cell is safe and do not present significant hazards under the condition of reasonably foreseeable misuse.	P
2.1	**Insulation and Wiring**	See below.	N/A
	Insulation Resistance between an accessible metal case (excluding electrical contacts) and positive terminals ≥ 5MΩ.	The metal case is electrical contact ("+").	N/A
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements	No internal wiring.	N/A
	Orientation of wiring maintains adequate creepage and clearance distances between conductors. Mechanical integrity of internal connections is sufficient to accommodate conditions of reasonably foreseeable misuse.	No internal wiring.	N/A
2.2	**Venting**	See below.	P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition.	The device of vent on the top side of cell as the pressure vent, up to release pressure. See pressure vent localization picture on page 22.	P
	Encapsulant used to support cells within an outer casing does not cause the battery to overheat during normal operation no inhibit pressure relief.	The cell is a built in product, which shall be enclosed in a rigid case, and will be evaluated in the final battery pack.	N/A
2.3	**Temperature/current management**	See below.	N/A
	The batteries are designed such that abnormal temperature rise conditions are prevented.	The cell is a built in product, its protection will be evaluated in the final battery pack.	N/A
	Means is provided to limit current to safe levels during charge and discharge.	The cell is a built in product, its protection will be evaluated in the final battery pack.	N/A

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
2.4	**Terminal contacts**	See below.	P
	Terminals have a clear polarity marking on the external surface of the battery	The Customized terminal was used.	N/A
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current.	The cross section area is considered enough to carry the rating current of the cell.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance.	The dedicated case of the cell described in the spec. can provide the proper mechanical strength and prevent the corrosion.	P
	Terminal contacts are arranged to minimize the risk of short circuits.	The distance between the terminals is considered enough to minimize the possibility of short circuits.	P
2.5	**Assembly of cells into batteries**	See below.	N/A
	Cells used in the battery assembly have closely matched capacities, are of the same design, and are of the same chemistry and same manufacturer.	Not a battery pack.	N/A
	The battery incorporates separate circuitry to prevent cell reversal from uneven charges as the pack is designed for the selective discharge of a portion of its series connected cells.	Not a battery pack.	N/A
2.6	**Quality Plan**		P
	The manufacture has prepared a quality plan defining the procedures for the inspection of materials, components, cells and batteries and which covers the process of producing each type of cell and battery.	The manufacturer's procedures for the inspection of materials, components, cells and which covers the process of producing each type of cell comply with the requirement.	P
3	**Type Test Conditions**		P
	Tests were conducted with the number of cells or batteries as outlined in Table 1 of IEC 62133 with cells or batteries that were not more than 3 months old.	The cells under testing were less than 3 months old.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	The testing was conducted at the ambient range of 20.0°C - 25°C.	P
4	**Specific requirements and tests**		P
4.1	**Charging procedure for test purposes**	The cells were charged in the ambient temp according to manufacturer's spec.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4.2	**Intended Use**	See below.	P
4.2.1	Continuous Low Rate Charge	See below.	P
	Fully charged cells are subjected for 28 days to a charge as specified by the manufacturer.	Five fully cells were submitted to 28 days test.	P
	Nickel systems: no fire, no explosion	Not a nickel cell.	N/A
	Lithium systems: no fire, no explosion, no leakage	No fire, no explosion, no leakage during and after the test.	P
4.2.2	Vibration	See below.	P
	The measured open circuit voltage of the fully charged cells or batteries is within anticipated parameters	Five different cells were fully charged according to clause 4.1.	P
	The cells or batteries are subjected to a vibration sequence as outlined in Table 2 of IEC 62133 with amplitude of 0.75 mm and a total maximum excursion of 1.52 mm. The frequency was varied at the rate of 1 Hz/min between the limits of 10 Hz and 55 Hz. The entire range of frequencies (10 Hz to 55 Hz) and return (55 Hz to 10 Hz) was traversed in 90 min ± 5 min for each mounting position.	Considered for the test. See appended mounting picture.	P
	The vibration was applied in each of three mutually perpendicular directions.	Considered for the test.	P
	Results: no fire, no explosion, no leakage	No fire, no explosion, no leakage after the vibration test. (See Table 4.2.2)	P
4.2.3	Moulded case stress at high ambient temperature	See below.	N/A
	Fully charged batteries were placed in an air-circulating oven at a temperature of 70°C ± 2°C for 7 hours. Afterwards, they are removed and allowed to return to room temperature.	The cell is a built in product, which shall be enclosed in a rigid case, and will be evaluated in the final battery pack.	N/A
	Results: no physical distortion of the battery casing resulting in exposure if internal components.	The cell is a built in product, which shall be enclosed in a rigid case, and will be evaluated in the final battery pack.	N/A
4.2.4	Temperature cycling	See below.	P
	Fully charged cells or batteries were subjected to temperature cycling (-20C, +75C) in forced draught chambers according to the procedure outlined in 4.2.4 b) and Fig. 1 of IEC 62133.	Five cells were fully charged and tested for these conditions. The used test samples' no.: No. 011 to No. 015	P
	After the fifth cycle, the cells or batteries were stored for 7 days prior to examination.	Considered.	P
	Results: No fire, no explosion, no leakage	No fire, no explosion, no leakage after the test.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4.3	**Reasonably foreseeable misuse**		P
4.3.1	Incorrect installation of a cell (nickel systems only)	Lithium system cells used.	N/A
	Four fully charged cells of the same brand, type, size and age were connected in series with one of the four cells reversed. The assembly was connected across a 1-ohm resistor until the vent opens or until the temperature of the reversed cell returns to ambient temperature.	Lithium system cells used.	N/A
	Alternatively, a stabilized dc power supply was used t simulate the conditions imposed on the reversed cell.	Lithium system cells used.	N/A
	Results: no fire, no explosion	Lithium system cells used.	N/A
4.3.2	External short circuit	See below.	P
	Fully charged cells or batteries were subjected to a short circuit test at 20°C ± 5°C.	Five cells were fully charged and tested for this condition. The testing was conducted at 22.1C.	P
	Fully charged cells or batteries were subjected to a short circuit test at 55°C ± 5°C.	Five cells were fully charged and tested for this condition. The testing was conducted at 56.3°C.	P
	The external resistance did not exceed 100 mΩ.	The external resistance is measured 79.9mΩ max.	P
	The cells or batteries were tested for 24 h or until the case temperature declined by 20% of the maximum temperature rise.	The cells were tested for until the case temperature declined by 20% of the maximum temperature rise.	P
	Results: no fire, no explosion.	No fire, no explosion after the test. (See Table 4.3.2)	P
4.3.3	Free fall	See below.	P
	Fully charged cells or batteries were dropped 3 times from a height of 1.0 m onto a concrete floor.	Three cells were fully charged and tested for this condition. The used test samples' no.: No. 021 to No. 023	P
	Results: no fire, no explosion	No fire, no explosion after the test.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4.3.4	Mechanical shock (crash hazard)	See below.	P
	Fully charged cells or batteries were subjected to a total of three shocks of equal magnitude applied in each of three mutually perpendicular directions. At least on of the directions was perpendicular to a flat face. During the initial 3 milliseconds, the minimum average acceleration was 75 g_n. The peak acceleration was between 125 g_n and 175 g_n.	Five cells were fully charged and tested for this condition. Refer to the photos and test charts for detail. Remark: (1) The used test samples' no.: No. 016 to No. 020. (2) The EUT were subjected to a total of three shocks of equal magnitude applied in each of two mutually perpendicular directions. (3) As there are two senses per direction, each sample will be submitted to a total of four shock impulses.	P
	Results: no fire, no explosion, no leakage	No fire, no explosion, no leakage after the test. See shock test appended mounting pictures.	P
4.3.5	Thermal abuse	See below	P
	Fully charged cells were placed in a gravity or circulating air-convention oven. The oven temperature was raised at a rate of 5°C/min ± 2°C/min to a temperature of 130°C ± 2°C. The cell remained at that temperature for 10 minutes before the test was discontinued.	Five cells were fully charged and tested for these conditions. The used test samples' no.: No. 034 to No. 038.	P
	Results: no fire, no explosion	No fire, no explosion, no leakage after the test.	P
4.3.6	Crushing of cells	See below.	P
	Fully charged cells were crushed between two flat surfaces with a hydraulic ram exerting a force of 13 kN ± 1 kN.	Two sets of five cells were fully charged and tested for these conditions.	P
	A cylindrical or prismatic cell was crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus.	First set of five cells. The used test samples' no.: No. 039, 041 and 043.	P
	A second set of prismatic cells was tested, rotated 90 degrees around their longitudinal axis compared to the first set.	Second set of five cells. The used test samples' no.: No. 040 and 042.	P
	Results: no fire, no explosion.	No fire, no explosion, no leakage after the test.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
4.3.7	Low pressure	See below.	P
	Fully charged cells are placed in a vacuum chamber whose internal pressure was gradually reduced to a pressure equal to or less than 11.6 kPa and held at that value for 6 hours.	Three cells were fully charged and tested for these conditions. The used test samples' no.: No. 044 to No. 046.	P
	Results: no fire, no explosion, no leakage	No fire, no explosion, no leakage after the test.	P
4.3.8	Overcharge for nickel systems	This is not a nickel system.	N/A
	A discharged cell or battery was subjected to a high-rate charge of 2.5 times the recommended charging current for a time that produced a 250% charge input (250% of rated capacity).	This is not a nickel system.	N/A
	Results: no fire, no explosion.	This is not a nickel system.	N/A
4.3.9	Overcharge for lithium systems	See below.	P
	A discharged cell was charged from a power supply of ≥ 10 V, at a charging current I_{rec} recommended by the manufacturer for 2.5 C_5/I_{rec} hours..	Five cells were charged by 10Vdc power sources for 12.5hrs. Duration = 2.5 x 60 Ah/ 12A = 12.5hrs	P
	Results: no fire, no explosion.	No fire, no explosion, no leakage after the test.	P
4.3.10	Forced discharge	See below	P
	Discharged cells intended for use in multi-cell applications, were subjected to a reverse charge 1t 1.0 I_t (A) for 90 minutes.	Five cells were discharged at 60A for 90min.	P
	Results: no fire, no explosion	No fire, no explosion, no leakage after the test.	P
4.3.11	Cell protection against a high charging rate (lithium systems only)	See below.	P
	Discharged cells were charged at three times the charging current recommended by the manufacturer until the cells was fully charged or an internal safety devices cut off the charge current before the cell became fully charged.	Five discharged cells were fully charged as required.	P
	Results: no fire, no explosion	No fire, no explosion, no leakage after the test.	P
5	**Information for safety**	See below.	P
	Information is provided to equipment manufacturers in the form of instructions to minimize and mitigate hazards associated with the cells or batteries in accordance with guidelines outlined in informative Annex A.	Provided in the cell specification, which is given to the equipment manufacturer.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict
	Information is provided to end-users in the form of instructions to minimize and mitigate hazards associated with the batteries in accordance with guidelines outlined in informative Annex B.	Provided in the cell specification, which will be considered during the end product investigation.	N/A
6	**Marking**		P
6.1	**Cell Marking**	See below.	P
	Nickel system cells are marked in accordance with IEC 61951-1, -2, IEC 61440, or IEC 61436 as applicable. See Copy of Marking Plate item in the beginning of this report.	This is not a nickel system.	N/A
	Lithium system cells are marked in accordance with IEC 61960. See Copy of Marking Plate item in the beginning of this report.	The cell will be used in the manufacture of a battery. See copy of the marking plate.	P
6.2	**Battery Marking**	See below.	N/A
	Batteries of nickel systems are marked in accordance with IEC 61951, or IEC 61951 -2 as applicable. See Copy of Marking Plate item in the beginning of this report	This is not a nickel system.	N/A
	Batteries of lithium system are marked in accordance with IEC 61960. See Copy of Marking Plate item in the beginning of this report.	It will be considered during the end product investigation.	N/A
	Batteries are marked with the cautionary marks.	It will be considered during the end product investigation.	N/A
6.3	**Other Information**	See below.	N/A
	Disposal instructions are marked on the battery or supplied in the information packaged with the battery.	Provided in the cell specification, and will be considered during the end product investigation.	N/A
	Recommended charging instruction are marked on the battery or supplied in the information packaged with the battery.	Provided in the cell specification, and will be considered during the end product investigation.	N/A
7	**Packaging**		P
	Cells or batteries were provided with packaging that was adequate to avoid mechanical damage during transport, handling and stacking. The materials and pack design was chosen to prevent the development of unintentional electrical conduction, corrosion of the terminal and ingress of moisture.	The proper packaging description is provided in the product specification, which can avoid the mechanical damage during the transport, handling, and stacking.	P

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

2.1 – 2.5	**TABLE: List of critical Components**				N/A
Object/part No.	Manufacturer/ trademark	Type/Model	Technical Data	Standard	Marks of Conformity
-	-	-	-	-	-
Supplementary information:					

	TABLE: 4.2.1 Continuous Low Rate Charge Test				P
Model	Recommended Charging Method, CC, CV, or CC/CV	Recommended Charging Voltage Vc, Vdc	Recommended Charging Current Irec, A	OCV at Start of Test, Vdc	Results
G35145208 (Sample no.: 001)	CC/CV	3.6	12	3.6	No fire, no explosion, no leakage
G35145208 (Sample no.: 002)	CC/CV	3.6	12	3.6	No fire, no explosion, no leakage
G35145208 (Sample no.: 003)	CC/CV	3.6	12	3.6	No fire, no explosion, no leakage
G35145208 (Sample no.: 004)	CC/CV	3.6	12	3.6	No fire, no explosion, no leakage
G35145208 (Sample no.: 005)	CC/CV	3.6	12	3.6	No fire, no explosion, no leakage
Supplementary information: - No Fire or Explosion - No Leakage Resistance of test wire 10mΩ max.					

	TABLE: 4.2.2 – Vibration Test		P
Model	OCV at Start of Test, Vdc	Results	
G35145208 (Sample no.: 006)	3.6 at X / Y / Z axis	No fire, no explosion, no leakage	
G35145208 (Sample no.: 007)	3.6 at X / Y / Z axis	No fire, no explosion, no leakage	
G35145208 (Sample no.: 008)	3.6 at X / Y / Z axis	No fire, no explosion, no leakage	
G35145208 (Sample no.: 009)	3.6 at X / Y / Z axis	No fire, no explosion, no leakage	
G35145208 (Sample no.: 010)	3.6 at X / Y / Z axis	No fire, no explosion, no leakage	
Supplementary information: - No Fire or Explosion - No Leakage			

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.3.1 – Incorrect Installation of a Cell Test (Nickel Systems)	N/A

Model	OCV (reversed cell), Vdc	Results
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Supplementary information:
This is not a nickel system.

	TABLE: 4.3.2 – External Short Circuit Test	P

Model	Ambient (At 20°C ± 5ºC or 55℃ ± 5°C)	OCV at start of test, Vdc	Resistance of Circuit, Ω	Maximum Case Temperature Rise ΔT, °C	Results
G35145208 (Sample no.: 024)	22.1	3.6	0.049	57.6	No fire, no explosion
G35145208 (Sample no.: 025)	22.1	3.6	0.051	75.1	No fire, no explosion
G35145208 (Sample no.: 026)	22.1	3.6	0.048	74.9	No fire, no explosion
G35145208 (Sample no.: 027)	22.1	3.6	0.047	76.9	No fire, no explosion
G35145208 (Sample no.: 028)	22.1	3.6	0.053	79.9	No fire, no explosion
G35145208 (Sample no.: 029)	56.3	3.6	0.061	30.8	No fire, no explosion
G35145208 (Sample no.: 030)	56.3	3.6	0.073	36.7	No fire, no explosion
G35145208 (Sample no.: 031)	56.3	3.6	0.062	39.0	No fire, no explosion
G35145208 (Sample no.: 032)	56.3	3.6	0.077	40.4	No fire, no explosion
G35145208 (Sample no.: 033)	56.3	3.6	0.069	49.0	No fire, no explosion

Supplementary information:
- No Fire or Explosion

	TABLE: 4.3.8 – Overcharge Test (Nickel Systems)	N/A

Model	OCV prior to charging, Vdc	Maximum Charge Current, A	Time for Charging, h	Results
--	--	--	--	--

Supplementary information:
Lithium ion rechargeable cell used.

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.3.9 – Overcharge Tests (Lithium Systems)				P
Model	OCV at start of test, Vdc	Maximum Charging Current, A	Maximum Charging Voltage, Vdc	Total Time of Charging, h	Results
G35145208 (Sample no.: 047)	2.0	12	10	12.5	No fire, no explosion
G35145208 (Sample no.: 048)	2.0	12	10	12.5	No fire, no explosion
G35145208 (Sample no.: 049)	2.0	12	10	12.5	No fire, no explosion
G35145208 (Sample no.: 050)	2.0	12	10	12.5	No fire, no explosion
G35145208 (Sample no.: 051)	2.0	12	10	12.5	No fire, no explosion
Supplementary information: - No Fire or Explosion Duration = 2.5 x 60 / 12 = 12.5hrs					

	TABLE: 4.3.10 – Forced Discharge Test			P
Model	OCV before application of reverse charge, Vdc	Measured Reverse Charge It, A	Total Time for Reversed Charge Application, Min	Results
G35145208 (Sample no.: 052)	2.0	60	90	No fire, no explosion
G35145208 (Sample no.: 053)	2.0	60	90	No fire, no explosion
G35145208 (Sample no.: 054)	2.0	60	90	No fire, no explosion
G35145208 (Sample no.: 055)	2.0	60	90	No fire, no explosion
G35145208 (Sample no.: 056)	2.0	60	90	No fire, no explosion
Supplementary information: - No Fire or Explosion				

IEC 62133			
Clause	Requirement + Test	Result - Remark	Verdict

	TABLE: 4.3.11 – Cell Protection Against a High Charging Rate Test (Lithium Systems)			P
Model	OCV at start of test, Vdc	Maximum Charging Current, A	Maximum Charging Voltage, Vdc	Results
G35145208 (Sample no.: 057)	2.0	180	3.6	No fire, no explosion
G35145208 (Sample no.: 058)	2.0	180	3.6	No fire, no explosion
G35145208 (Sample no.: 059)	2.0	180	3.6	No fire, no explosion
G35145208 (Sample no.: 060)	2.0	180	3.6	No fire, no explosion
G35145208 (Sample no.: 061)	2.0	180	3.6	No fire, no explosion
Supplementary information: - No Fire or Explosion				

List of test equipment used:
(Note: This is an example of the required attachment. Other forms with a different layout but containing similar information are also acceptable.)

Clause	Measurement / testing	Testing / measuring equipment / material used	Range used	Calibration date
See next page				

File No:
Project No:

INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

Test	Used	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
Thermal abuse	V	1. 970210		Test Oven	TAICHY	MCKR-200	Jun-10-2013	Jun-09-2014
Mechanical shock	V	2. 0K97		Shock Tester	VISOURCE	SHOCK-2	Jun-25-2013	Jun-24-2014
Crushing of cells	V	3. 9701		Hydraulic Ram Apparatus	Asia Qtech	AT-1	May-20-2013	May-19-2014
Low pressure	V	4. 0801		Vacuum Chamber	Asia Qtech	A-1	Oct-12-2012	Oct-11-2013
Heating		11. 41VA0567	-40℃-400℃, 30CH	Hybrid Recorder	Yokokawa	HR 2500E	Apr-18-2013	Apr-17-2014
		13. 43VH0086	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	HR 1300	Dec-24-2012	Dec-23-2013
	V	14. 48JE0043	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR130	Jun-10-2013	Jun-09-2014
Input / Leakage /		22. 805020222	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Sep-07-2012	Sep-06-2013
Heating / Abnormal		23. 805020223	250V/10A, 300W *1	Electric Load	Prodigit 3302	3302	Nov-16-2012	Nov-15-2013
		24. 805020220	150V/8A, 300W *1	Electric Load	Prodigit 3302	3251	Dec-19-2012	Dec-18-2013
Enclosure Push		31. 080353	0 - 30 Kg.	Push - Pull Meter	Aikoh	AE-30	Nov-12-2012	Nov-11-2013
General		39. 70360742	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Jul-05-2013	Jul-04-2014
	V	40. 70360755	R, V, A. Full Range	Digital Multimeter	Fluke	87-III	Jul-23-2013	Jul-22-2014
	V	46. —	Real Time	Timer (Clock)	Chyau Jye	Chyau Jye	Nov-12-2012	Nov-11-2013
		46-1. 8330R	Real Time	Timer (Clock)	ORIENT	QUARTZ	Jun-25-2013	Jun-24-2014
Insulation		53. 1420073	30-1000V, 0.1-50GΩ	Insulation Tester	Extech	8205	Sep-12-2012	Sep-11-2013
	V	57.12WB22613	0-200℃, 60CH	Recorder	Yokokawa	DR230	Apr-18-2013	Apr-17-2014
Heating		66. DU200-32	-40℃-400℃, 30CH	Recorder	Yokokawa	DR230	Nov-30-2012	Nov-29-2013
Input / Leakage /		71. 204020068	500V/5A, 200W*1	Electric Load	Prodigit 3324	3302	Mar-15-2013	Mar-14-2014
		73. 204020077	250V/10A, 300W*1	Electric Load	Prodigit 3312C	3302	Nov-16-2012	Nov-15-2013
Heating		77. 12A933583	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR130	Mar-13-2013	Mar-12-2014
		78. 12B615473	-40℃-400℃, 30CH	Recorder	Yokokawa	DR230	Jun-18-2013	Jun-17-2014
		86. 12B419024	-40℃-400℃, 30CH	Recorder	Yokokawa	DR130-00-24-1	Jun-27-2013	Jun-26-2014
Vibration	V	87. 4292	10Hz-100Hz, 0.2-1.5mm	Vibration Test	VISOURCE	VS-5060L	Dec-03-2012	Dec-02-2013

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Project No:

INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

Issued Date: 05-27-08
Revised:07-31-2013

Test	Used	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
		101. 27CA14591	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Jan-24-2013	Jan-23-2014
		102. 27CA14592	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Aug-30-2012	Aug-29-2013
		103. 27CA14593	-40℃-1000℃, 30 CH	Hybrid Recorder	Yokogawa	DR-230	May-09-2013	May-08-2014
		104. 27CA14594	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Oct-02-2012	Oct-01-2013
		105. 27CA14595	-40℃-400℃, 30CH	Hybrid Recorder	Yokogawa	DR-230	Oct-11-2012	Oct-10-2013
Input / Leakage /		106. 30801A016	60V/60A	Electronic Load	Prodigit	3301A	May-16-2013	May-15-2014
Heating / Abnormal		107. 30801A017	60V/60A	Electronic Load	Prodigit	3301A	Jan-03-2011	stop use
		108. 30801A019	60V/60A	Electronic Load	Prodigit	3301A	May-16-2013	May-15-2014
		109. 30801A020	60V/60A	Electronic Load	Prodigit	3301A	Dec-19-2012	Dec-18-2013
		110. 30901A021	60V/60A	Electronic Load	Prodigit	3301A	Jul-23-2013	Jul-22-2014
General		113. 033290010	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM859CF	Sep-11-2012	Sep-10-2013
		114. 033290030	R, V, A full range	DC+AC 100kHz TRMS DMM	BRYMEN	BM859CF	Nov-05-2012	Nov-04-2013
Temperature cycling	V	116.920904	-70℃~100℃, 20%~98% RH	THERMO-HYGROMETER	TAICHY	MHU-480SU	Nov-23-2012	Nov-22-2013
Moulded case stress at high ambient temperature		117.920905	0-200℃	TEMPERATUER OVEN	TAICHY	CK-500	Nov-23-2012	Nov-22-2013
General		122.680594	0-500V, 20A	Digital Power Meter	Idrc	CP-320A	Dec-20-2012	Dec-19-2013
	V	124.357158	0-600V, 50A	Digital Power Meter	Idrc	CP-350	Jul-02-2013	Jul-01-2014
Free fall	V	128. —	0-5m	tape measure	KDS	5.5mm	Jun-25-2013	Jun-24-2014
Heating		135. 27E214538 504	-40℃-400℃, 30CH	Data Acquisition Unit	Yokogawa	MX100-E-1D	Jan-16-2013	Jan-15-2014
General	V	137. 40905090004	0.03μH~9999H, 0.003pF~80.00mF, 0Ω~500MΩ	LCR Meter	Motech	MT4090/I-S1	Jan-28-2013	Jan-27-2014
Incorrect installation of a cell		154. —	—	1ohm Resistor	Yen Sheng	—	—	—
		160. 9100201	—	Crush Tester Equipment	Asia Qtech	IB-5	Oct-08-2012	Oct-07-2013
		161. 9100202	—	Projectile Tester Equipment	博紳	PROJ-8	Oct-08-2012	Oct-07-2013

File No:
Project No:

INSTRUMENTATION RECORD DATA SHEET
TEST INSTRUMENTS

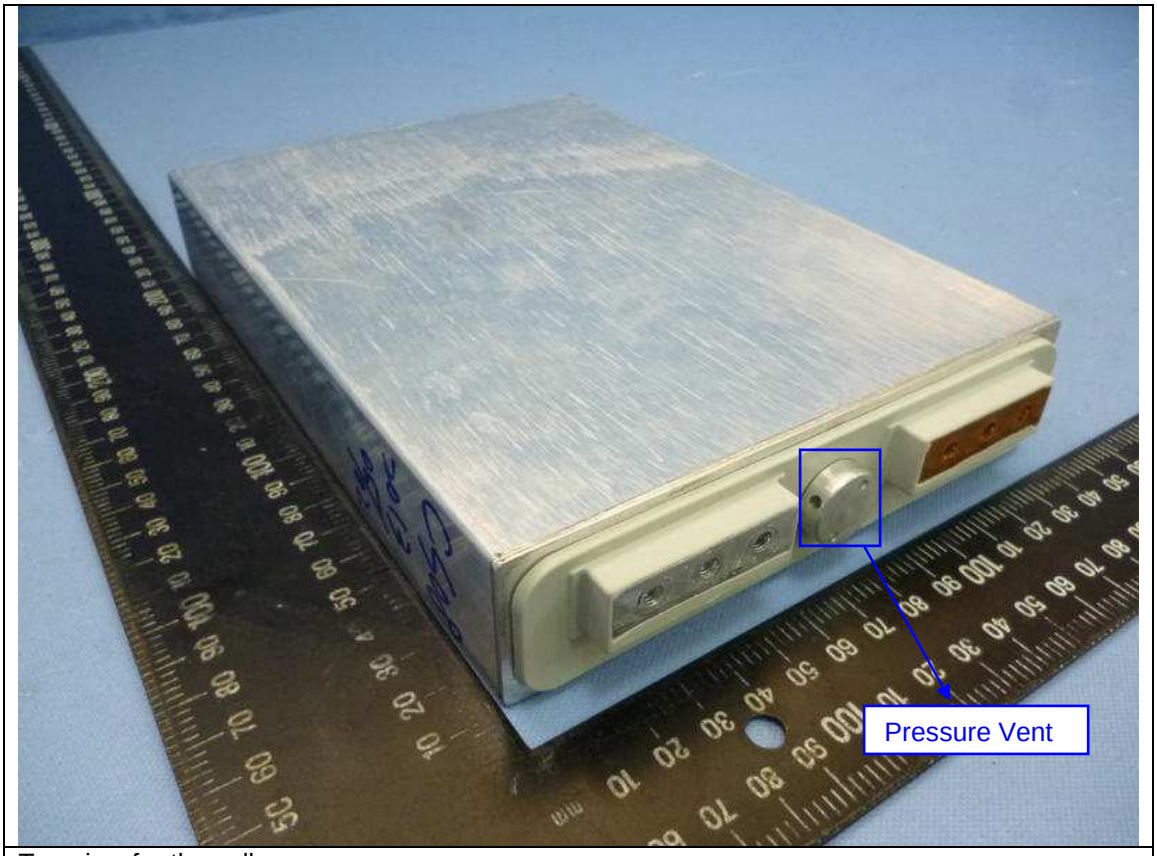
Issued Date: 05-27-08
Revised:07-31-2013

Test	Used	Instr No. S/N.	Range Used	* Instruments, Type	Maker	Model	Calibration Date	Calibration Due
		166. 3302F-01-00602FD0434	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-05-2013	Jul-04-2014
		167. 3302F-01-00602FD0441	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-10-2012	under calibration
		168. 3302F-01-00602FD0436	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-05-2013	Jul-04-2014
		169. 3302F-01-00602FD0435	60V/60A/300W	Electronic Load	Prodigit	3302F-01-11F	Jul-05-2013	Jul-04-2014
		170.500156	30V,25A	Programable DC Source	IDRC	DSP-030-025HD	Jul-26-2013	Jul-25-2014
	V	171.500157	30V,25A	Programable DC Source	IDRC	DSP-030-026HD	Jul-26-2013	Jul-25-2014
		172.500155	30V,25A	Programable DC Source	IDRC	DSP-030-027HD	Jul-26-2013	Jul-25-2014
		173.500158	30V,25A	Programable DC Source	IDRC	DSP-030-028HD	Jul-26-2013	Jul-25-2014
		N/A	900~1100mbar	Atmospheric-pressure gauge	永發	YF-72	Nov-12-2012	Nov-11-2013
Vibration		214.6293	1Hz-200Hz, 0.2-1mm	Vibration Test	振儀科技	VS-100	Jan-14-2013	Jan-13-2014

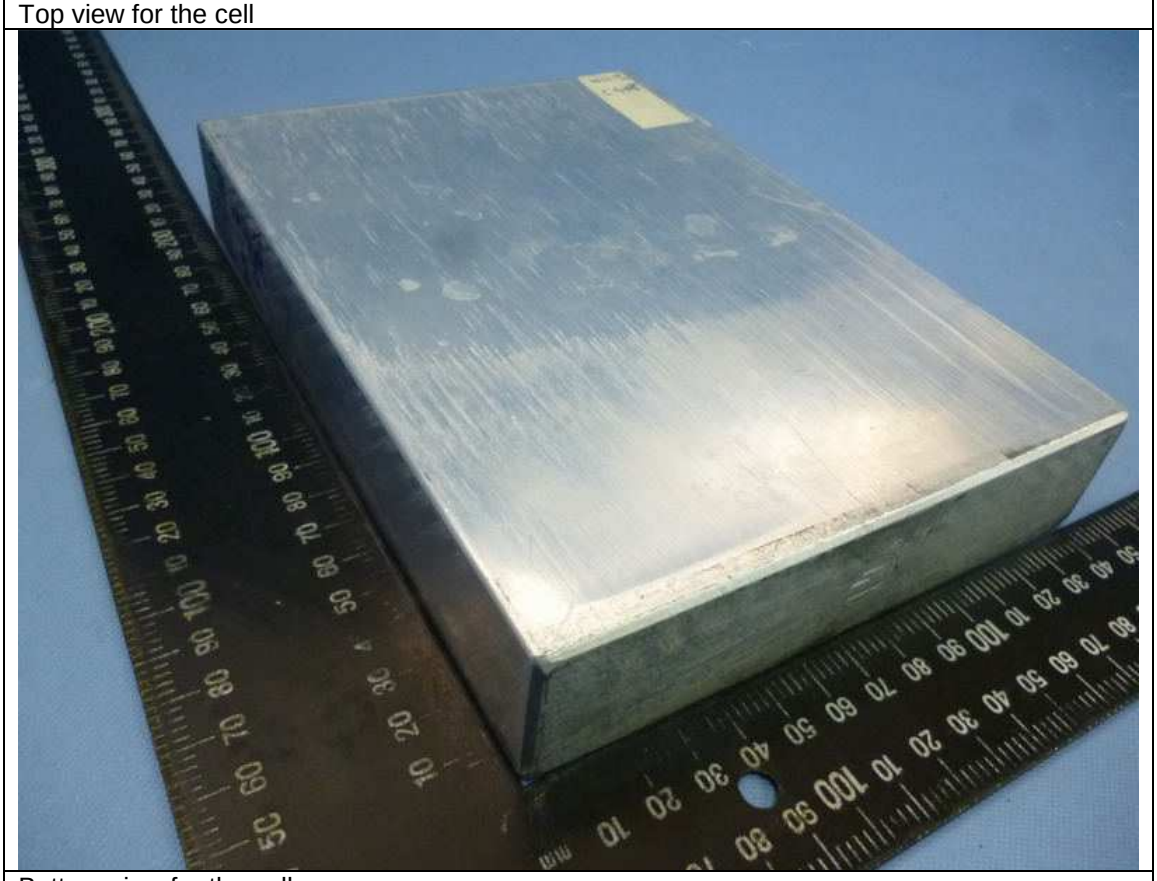
MAXIMUM UNCERTAINTIES OF MEASUREMENTS

This table indicates the maximum values of uncertainties associated with the tests being able to be present in this document.

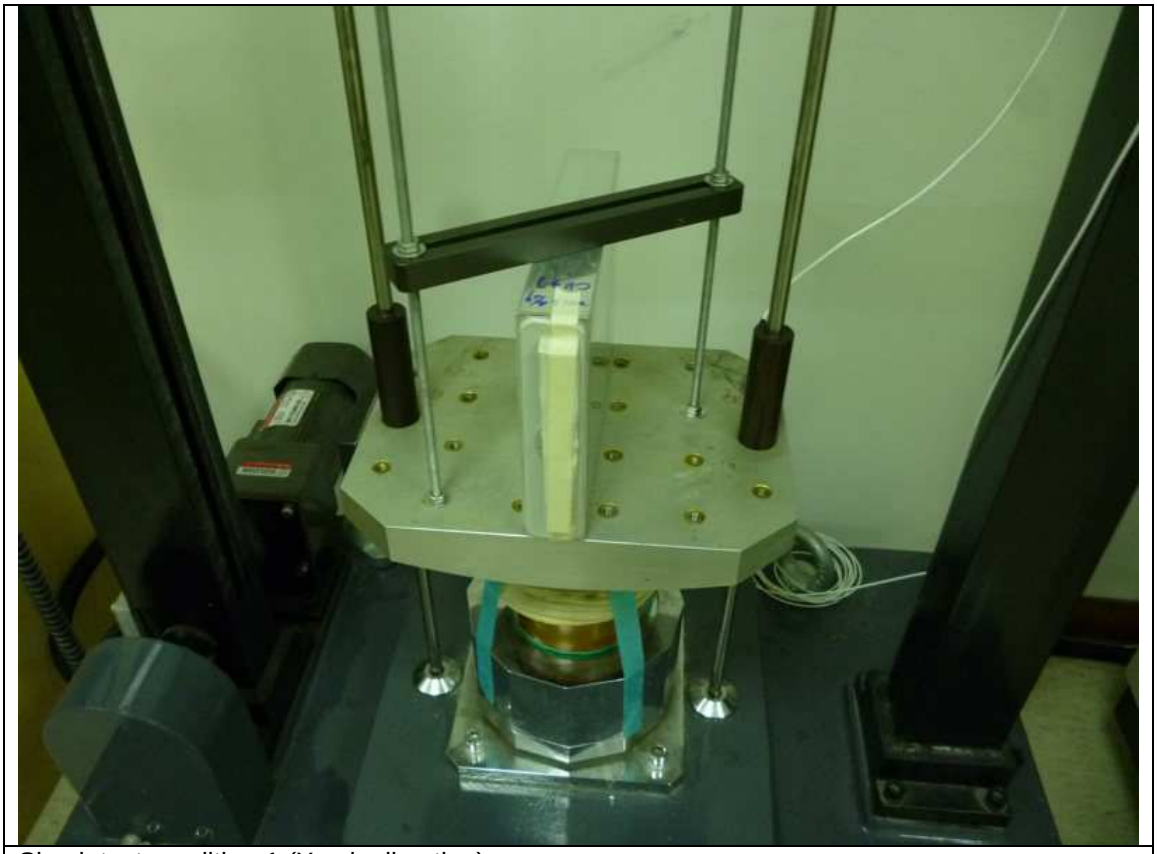
Type of measurement	Uncertainty of measurement (k=2)
Generic measure of electrical value by direct reading of digital instrument) ● Voltage (V) ● Current (A) ● Power (W) ● Resistance (Ohms)	 (V) meter accuracy 0.1% (A) meter accuracy 0.5% (W) meter accuracy 1.0% (Ohms) meter accuracy 1.5%
Generic measure of time	+/- 0.38 Second
Generic measure of length value	caliper (0-200mm): +/-0.15 mm tape measure (0-500cm): +/-1.4 mm
Generic measure of weight value	scale (0-600g): +/- 0.55 g balance (0-150kg): +/- 15.95 g
Continuous low-rate charging (Voltage, Current, Time)	+/- 0.276%
Vibration (Voltage, Current, Time)	+/- 3%
Moulded case stress at high ambient temperature (Voltage, Current, Time)	+/- 0.6%
Temperature cycling (Voltage, Current, Time)	+/- 0.6%
Incorrect installation of a cell (nickel systems only) (Voltage, Current, Temperature, Time, Capacity)	+/- 0.74%
External short circuit (Temperature, Time, Capacity)	+/- 0.8%
Free fall (Voltage, Current, Dimension)	+/- 0.11%
Mechanical shock (crash hazard) (Voltage, Current, Temperature, Time)	+/- 11.8%
Thermal abuse (Voltage, Current, Temperature, Time)	+/- 0.738%
Crushing of cells (Voltage, Current)	+/- 0.216%
Low pressure (Voltage, Current, Temperature, Time, Dimension)	+/- 5.013%
Overcharge for nickel systems (Voltage, Current, Time)	+/- 0.50%
Overcharge for lithium systems (Voltage, Current, Time)	+/- 0.22%
Forced discharge (Voltage, Current, Time)	+/- 0.52%
Cell protection against a high charging rate (lithium systems only) (Voltage, Current)	+/- 0.24%



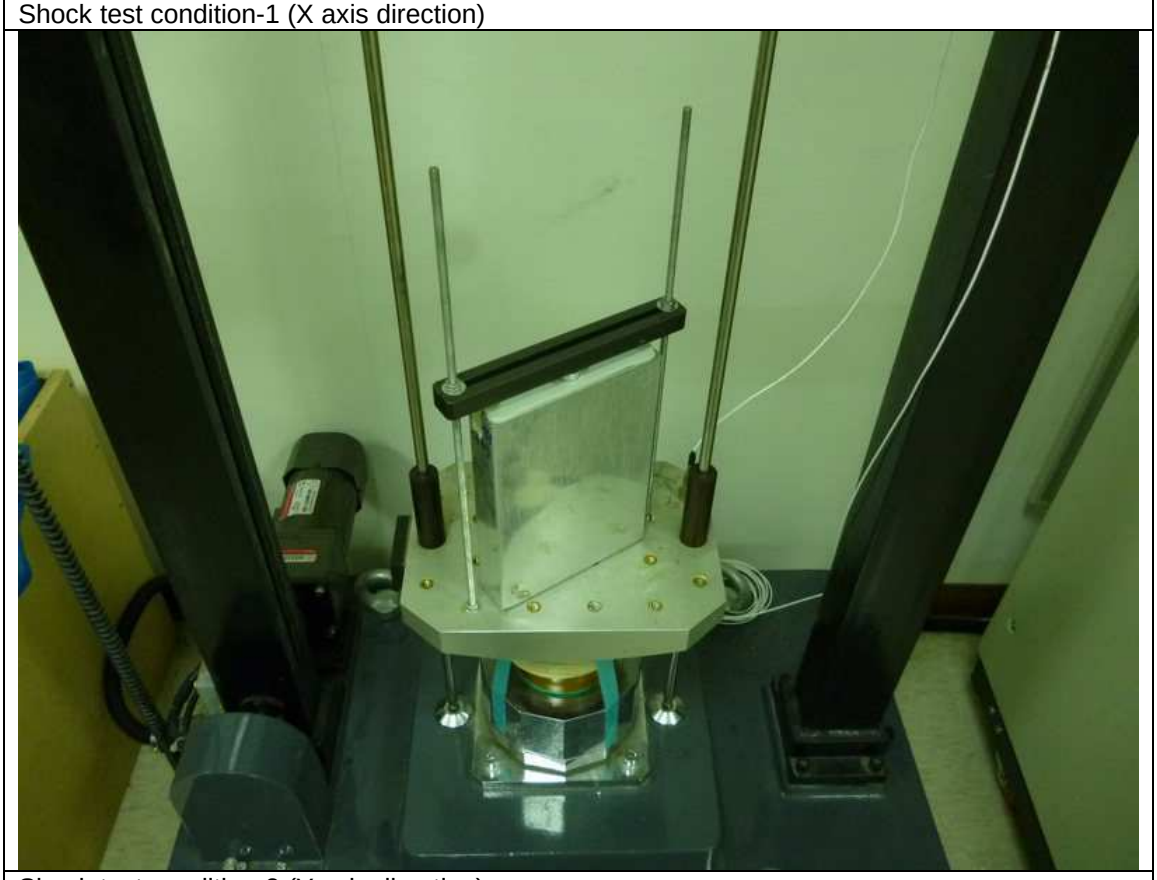
Top view for the cell



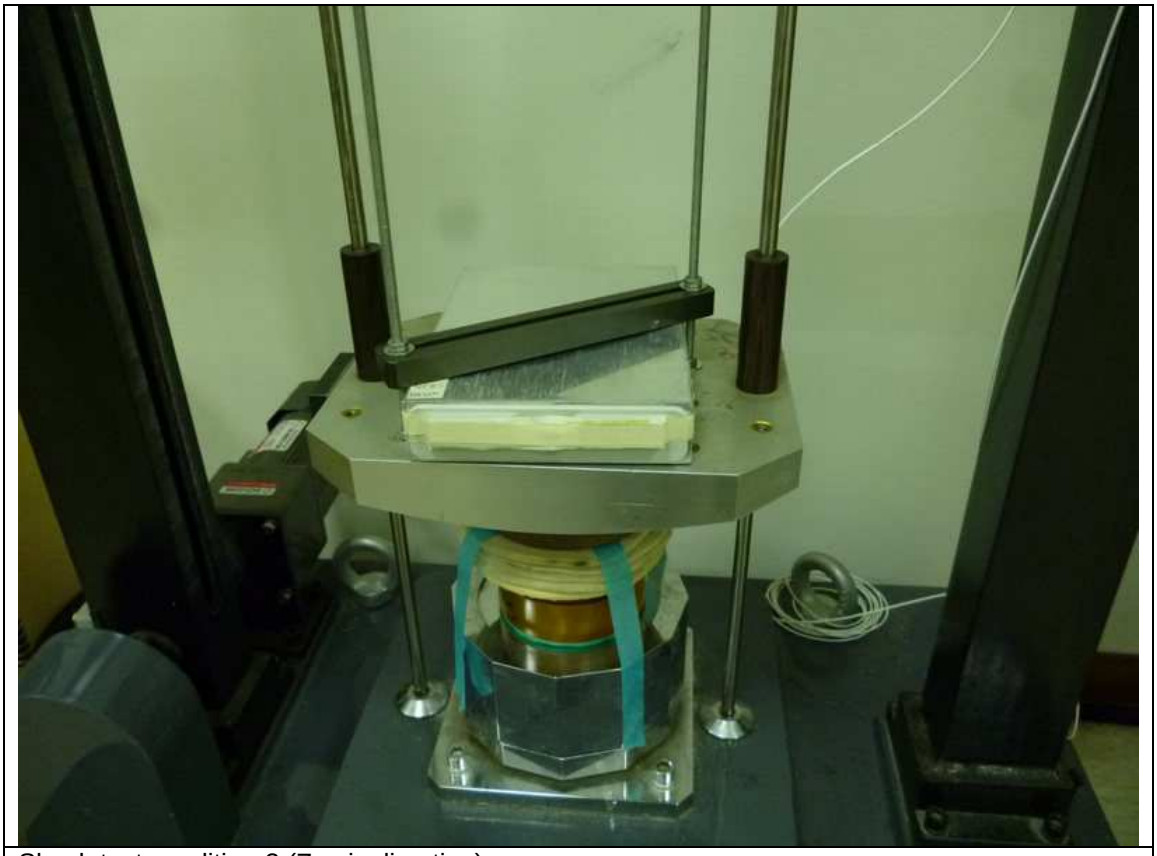
Bottom view for the cell



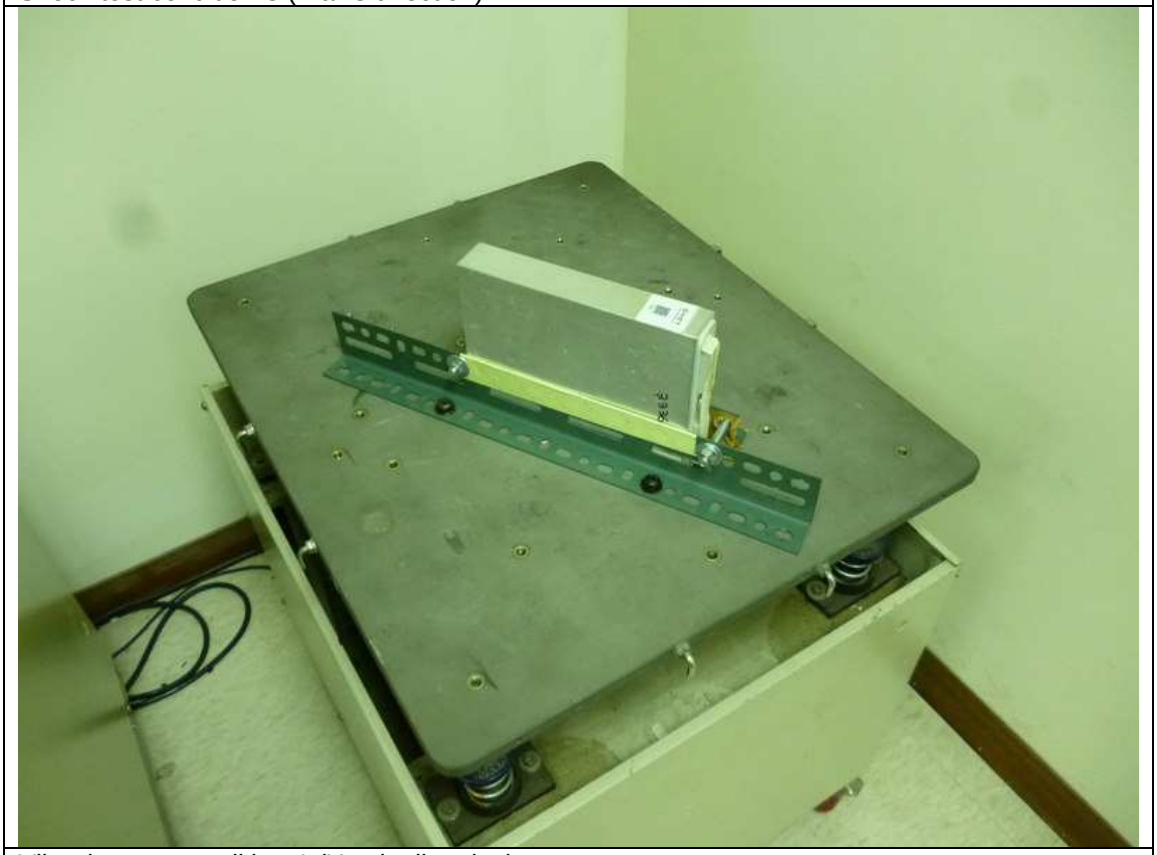
Shock test condition-1 (X axis direction)



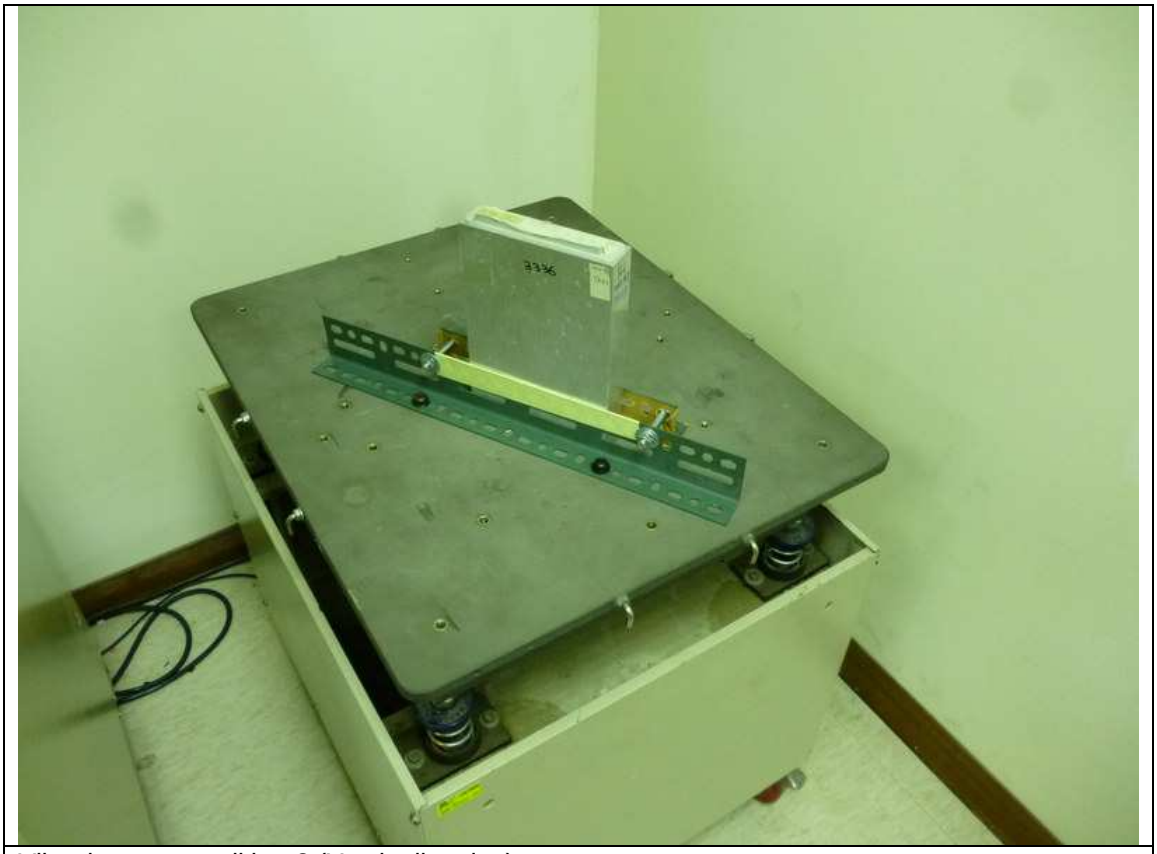
Shock test condition-2 (Y axis direction)



Shock test condition-3 (Z axis direction)



Vibration test condition-1 (X axis direction)



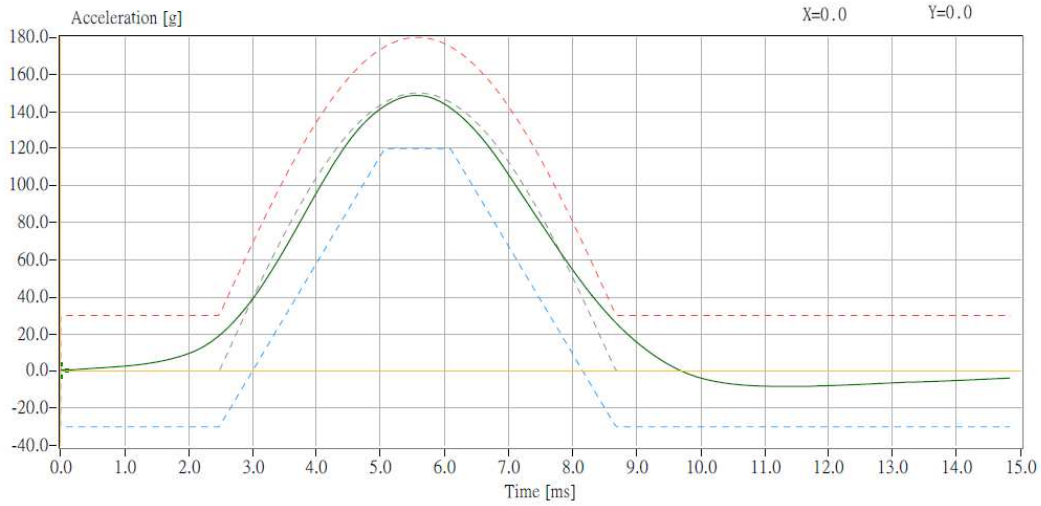
Vibration test condition-2 (Y axis direction)

Vibration test condition-3 (Z axis direction)

Shock Test Report

1.Customer : GMET Mfg Processes Co.,Ltd.
2.Operator : Taocheng
3.Lot No. : 130626C12-X
4.Date : 2013/7/18
5.Time : PM 01:20:11
6.Temperature: 22C
7.Specimen : G350145208
8.Test Style : Shock Test
9.Standard : IEC62133
10.Filename : E:\Taocheng\130626C12\IEC62133\62133 shock\Shock-X\@test.buf
11.Notice : PASS

12.Set Peak Accele. : 150.00g [1470.84m/s^2]
13.Set Duration Time: 6.20 ms
14.Set Velocity : 5.81 m/sec
15.Set Cycle : 1 Cycle
16.Test Peak Accele.: 148.69g [1458.01m/s^2]
17.Test Velocity : 5.96 m/sec
18.Ini 3ms Average Accele. : 81.73g [801.42m/s^2]
19.1/4 Sine Average Accele. : 90.24g [884.85m/s^2]
20.Test Cycle : 1 Cycle
21.Real Duration Time: 6.73 ms
22.Shock Wave : Half Sine

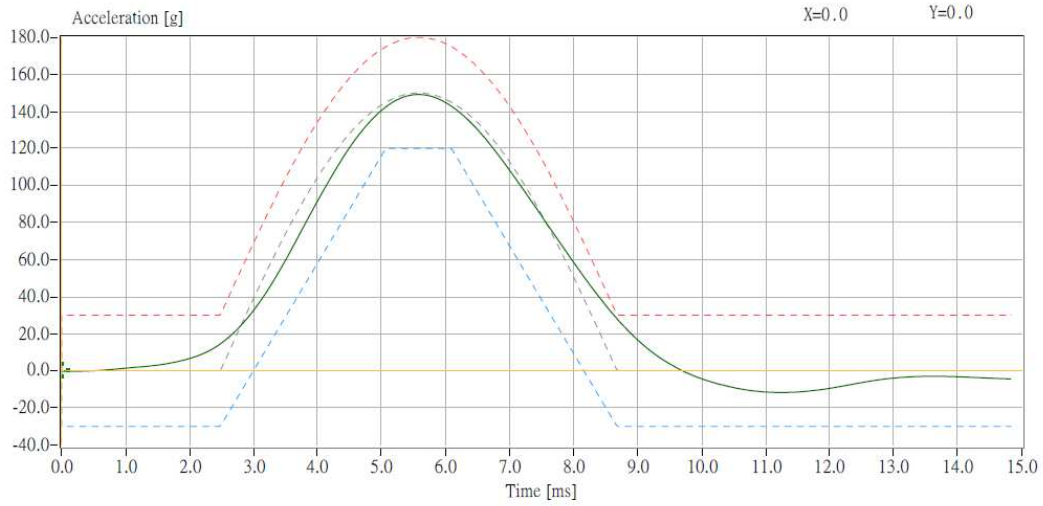


Shock test chart-X axis direction

Shock Test Report

1.Customer : GMET Mfg Processes Co.,Ltd.
2.Operator : Taocheng
3.Lot No. : 130626C12-Y
4.Date : 2013/7/18
5.Time : AM 10:34:03
6.Temperature: 22C
7.Specimen : G350145208
8.Test Style : Shock Test
9.Standard : IEC62133
10.Filename : E:\Taocheng\130626C12\IEC62133\62133 shock\Shock-Y\@test.buf
11.Notice : PASS

12.Set Peak Accele. : 150.00g [1470.84m/s^2]
13.Set Duration Time: 6.20 ms
14.Set Velocity : 5.81 m/sec
15.Set Cycle : 1 Cycle
16.Test Peak Accele.: 149.19g [1462.92m/s^2]
17.Test Velocity : 5.87 m/sec
18.Ini 3ms Average Accele. : 84.99g [833.42m/s^2]
19.1/4 Sine Average Accele. : 90.26g [885.04m/s^2]
20.Test Cycle : 1 Cycle
21.Real Duration Time: 6.63 ms
22.Shock Wave : Half Sine

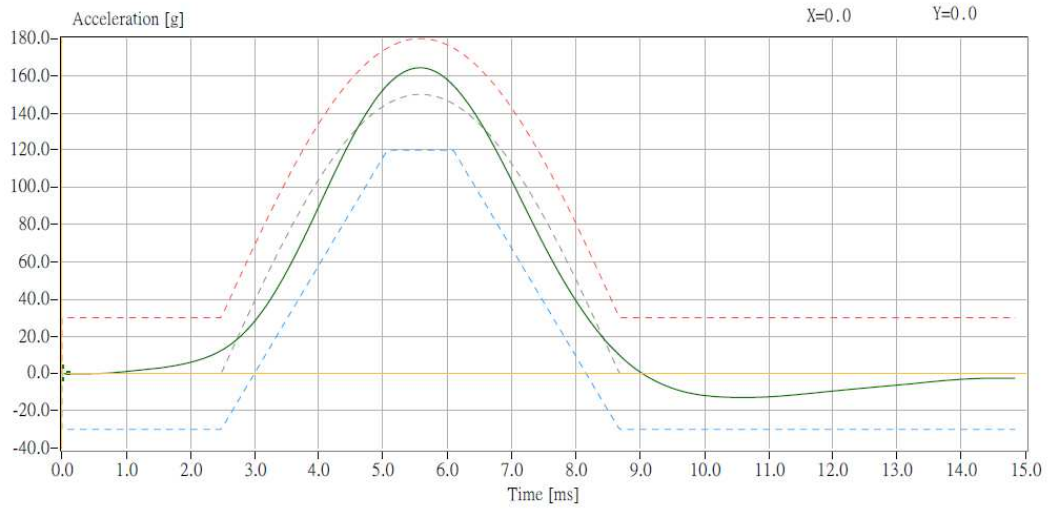


Shock test chart-Y axis direction

Shock Test Report

1.Customer : GMET Mfg Processes Co.,Ltd.
2.Operator : Taocheng
3.Lot No. : 130626C12-Z
4.Date : 2013/07/18
5.Time : AM 09:28:48
6.Temperature: 23C
7.Specimen : G350145208
8.Test Style : Shock Test
9.Standard : IEC62133
10.Filename : E:\Taocheng\130626C12\IEC62133\
62133 shock\Shock-Z\130626C12
11.Notice : PASS

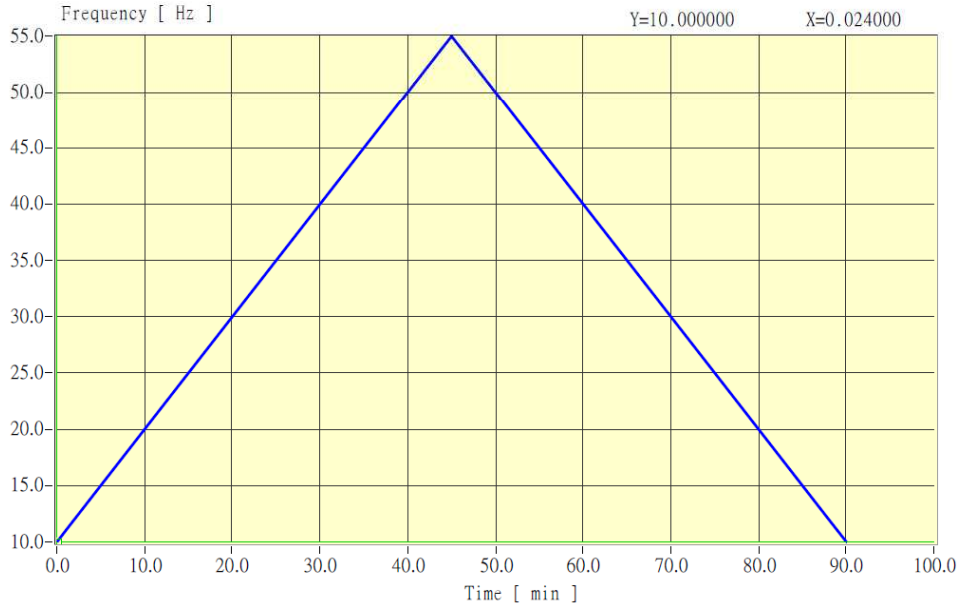
12.Set Peak Accele. : 150.00g [1470.84m/s^2]
13.Set Duration Time: 6.20 ms
14.Set Velocity : 5.81 m/sec
15.Set Cycle : 1 Cycle
16.Test Peak Accele.: 164.38g [1611.87m/s^2]
17.Test Velocity : 5.68 m/sec
18.Ini 3ms Average Accele. : 91.50g [897.22m/s^2]
19.1/4 Sine Average Accele. : 96.61g [947.28m/s^2]
20.Test Cycle : 1 Cycle
21.Real Duration Time: 6.00 ms
22.Shock Wave : Half Sine



Shock test chart-Z axis direction

Vibration Test

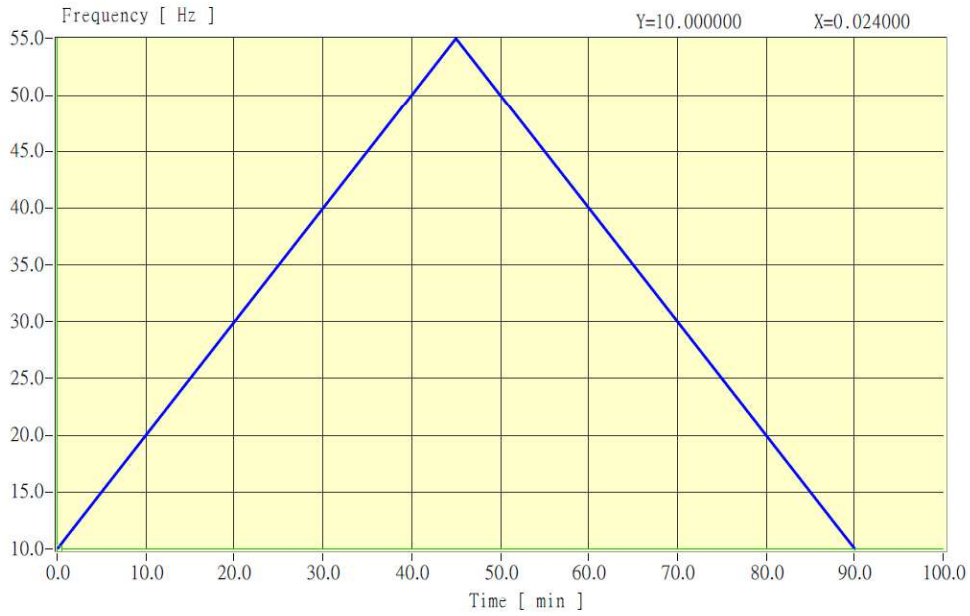
1.Company : GMET Mfg Processes Co., Ltd.
2.Date : 2013/7/17
3.Test No. : 130626C12-X
4.Time : AM 10:27:28
5.Test Mode : Sweep Frequency
6.Process Time : 91.0min
7.Start Frequency: 10.0Hz
8.Sweep Type : Liner Sweep 0.0167 Hz/sec
9.Stop Frequency: 55.0Hz
10.Specify Amplit.: 0.76mm
11.Sweep Cycle : 1.0cycles
12.Sweep Time : 90.0min/cycle
13.Vibration Count: 2.969E+3cycles
14.File Name : C:\Vs04xp\@test.buf



Vibration test chart-X axis direction

Vibration Test

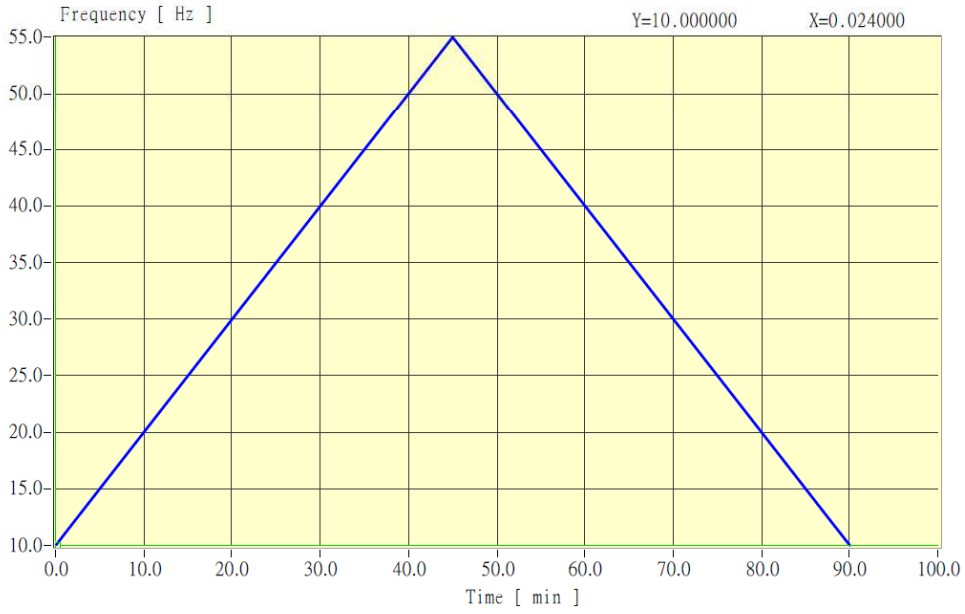
1.Company : GMET Mfg Processes Co., Ltd.
2.Date : 2013/7/17
3.Test No. : 130626C12-Y
4.Time : PM 01:05:00
5.Test Mode : Sweep Frequency
6.Process Time : 91.0min
7.Start Frequency: 10.0Hz
8.Sweep Type : Liner Sweep 0.0167 Hz/sec
9.Stop Frequency: 55.0Hz
10.Specify Amplit.: 0.76mm
11.Sweep Cycle : 1.0cycles
12.Sweep Time : 90.0min/cycle
13.Vibration Count: 2.945E+3cycles
14.File Name : C:\Vs04xp\@test.buf



Vibration test chart-Y axis direction

Vibration Test

1.Company : GMET Mfg Processes Co., Ltd.
2.Date : 2013/7/17
3.Test No. : 130626C12-Z
4.Time : PM 04:37:23
5.Test Mode : Sweep Frequency
6.Process Time : 91.0min
7.Start Frequency: 10.0Hz
8.Sweep Type : Liner Sweep 0.0167 Hz/sec
9.Stop Frequency: 55.0Hz
10.Specify Amplit.: 0.76mm
11.Sweep Cycle : 1.0cycles
12.Sweep Time : 90.0min/cycle
13.Vibration Count: 2.945E+3cycles
14.File Name : C:\Vs04xp\@test.buf



Vibration test chart-Z axis direction