

INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

[A Division of NATRIp Implementation Society (NATIS), Govt. of India]

TEST REPORT (Supplementary Test Report)

Non-Transferable

ULR No.: TC536020040000169F
Test Report No.: C T 1 G P 8 3 6 5

Date: 25.11.2020

- 1.0 NAME AND ADDRESS OF THE CUSTOMER : **M/s. Okaya Power Private Limited**
H-19, Udyog Nagar Rohtak Road Udyog Nagar-110041
New Delhi INDIA
- 1.1 NAME AND ADDRESS OF THE MANUFACTURER : Same as Serial No.1.0
- 2.0 CUSTOMER LETTER REF : IOCS No. CCTEOKYAPLEEL124350 Dated 05-Oct-2020

3.0 DESCRIPTION OF DEVICE UNDER TEST (DUT):

DUT Name	Battery pack, 51.2 V DC
Battery pack Type	Lithium Ion Battery (LiFePo4)
Battery Pack Capacity(Ah)	160Ah (Ah in 5 hrs)
Battery Pack Rated Voltage	51.2 V DC
Pack Model No.	LF51160E
Cell Model	LF80A-73103
Cell Rating	3.2V 80Ah
Configuration of Cells in Pack	16S2P
Cell Manufacture name	EVE Energy Co., Ltd.
Quantity	02 Nos. of Battery pack (ICAT/EEL/124350/02)
Trade Name	OKAYA
Drawing No.	OPG-002-0619-0006



4.0 JUSTIFICATION FOR EXTENSION:

Battery mentioned in Sr.no. 3.0 has already been approved as per AIS:048 vide Test report no.CT0BP5001 dated. 07.01.2020. The customer now seeks extension for the same component as per amendment 2 (01/2020) of AIS:048 after conduction of vibration test and shock test.

5.0 DATE OF RECEIPT OF SAMPLE: 06.11.2020

6.0 CONDITION OF SAMPLE: No physical damage observed.

7.0 TEST OBJECTIVE: To validate the Safety Requirements of Traction Battery as per AIS: 048 as amended upto date.

8.0 TEST METHOD: Test method referred from AIS: 048 as amended upto date.

9.0 FUNCTIONAL VERIFICATION: Functional verification done and Battery pack was found satisfactory.

10.0 CONCLUSION: The battery specified in Sr.No.3.0 of this test report met all the test requirements when tested as per AIS:048 as amended upto date as mentioned in Annexure-I of this report.

11.0 TEST DESCRIPTION: Please refer the Annexure-I of this report.



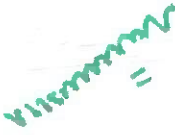
12.0 DATE OF PERFORMANCE OF TEST: Please refer the Annexure-I of this report.

13.0 TEST RESULTS: Please refer the Test requirements and Results in Annexure-I of this report.

14.0 LOCATION OF TEST: ICAT CENTRE-I

15.0 ANY DEVIATION OR EXCLUSIVE FROM TEST METHOD: Not Applicable.




Note: This Report should be read along with test Report No. CT0BP5001 dated. 07.01.2020.

Prepared By	Checked By	Approved By
		
UDIT KAUL Dy. Manager	DEVESH PAREEK Manager	PAMELA TIKKU Sr. General Manager



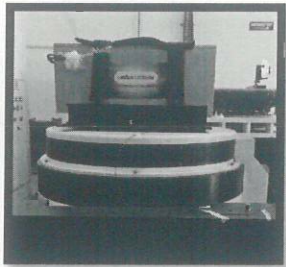
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Prepared By		Checked By	Page 02 of 05 + Dwg (01) [124350]
			
UDIT KAUL Dy. Manager		DEVESH PAREEK Manager	

Annexure-I

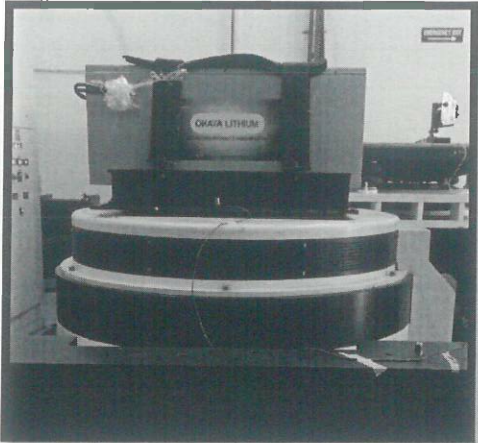
1.0 TEST REQUIREMENTS AND RESULTS:




Cl. No.	Test	Test Description	Observations/Results
2.2 Mechanical Tests			
2.2.1	<p>Vibration test (Test ID:ICAT/ EEL /124350/01) Date of test : 21.11.2020</p>	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature, firmly held on the vibration table in vehicle mounting position. Vibration test will be carried out in three-axis(x, y, z). Axis: Vertical and Horizontal axis, with battery positioned in longitudinal direction. Acceleration: 3 g (sinusoidal vibration) Frequency: 30-150 Hz Sweep rate: 1 octave per minute Duration: 2 hours in each axis Immediately after the test, discharge the battery at room temperature not exceeding 30°C, at the rate of I = 0.2 x Battery capacity(C₅)</p> <p>Acceptance Criteria: During test, there shall be no electrolyte loss. The deterioration of battery rated capacity during discharging shall not be more than 10%. At the end of the test, there shall be no: a) Physical damage to the casing or other mechanical parts b) Fire or explosion</p>	<p>No electrolyte loss observed during test. Immediately after the test, Battery pack was discharged at 32 A and deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p>Satisfactory.</p>

Prepared By		Checked By	Page 03 of 05 + Dwg (01) [124350]
			
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ULR No.: TC536020040000169F
 Test Report No.: C T 1 G P 8 3 6 5

Date: 25.11.2020

Cl. No.	Test	Test Description	Observations/Results
2.2.2	<p>Shock test (Test ID: ICAT/ EEL /124350/02) Date of test : 21.11.2020</p>	 <p>Battery Condition: Fully charged (100% SOC), contained at ambient temperature not exceeding 30°C, firmly held on the vibration table in vehicle mounting position. Shock test will be carried out in three-axis(x, y, z). Axis: Vertical and Horizontal axis, with battery positioned in longitudinal direction. Acceleration: 30 g (half-sine wave) No. of shocks: 10 in each axis Duration: 15 ms of each shock Immediately after the test, discharge the battery at room temperature, at the rate of $I = 0.2 \times \text{Battery capacity}(C_5)$</p> <p>Acceptance Criteria: The deterioration of battery rated capacity during discharging shall not be more than 10%. At the end of the test, there shall be no: a) Physical damage to the casing or other mechanical parts b) Fire or explosion.</p>	<p>Immediately after the test, Battery pack was discharged at 32 A and deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p>Satisfactory.</p>

Prepared By		Checked By	Page 04 of 05 + Dwg (01) [124350]
 UDIT KAUL Dy. Manager		 DEVESH PAREEK Manager	




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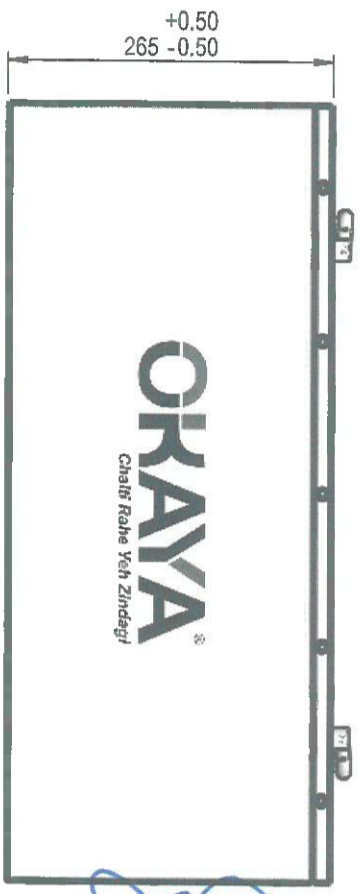
Cl. No.	Test	Test Description	Observations/Results
2.2.4	Nail Penetration	<p>The battery Cell shall be penetrated with a mild steel (conductive) pointed rod, which will be electrically insulated from the test fixture. The test will be carried out with 100% SOC of the Battery cell/Battery pack</p> <p>Rate of penetration: 8 cm/s.</p> <p>Diameter of Rod: 3mm</p> <p>Orientation of penetration: perpendicular to the electrode plates.</p> <p>Minimum Depth of penetration: Through cells</p> <p>The battery Cell should be observed, with the rod remaining in place, for a minimum of one hour after the test.</p> <p>Acceptance Criteria:</p> <p>At the end of the test, there shall be no:</p> <p>a) Melting of components.</p> <p>b) Fire or explosion</p>	<p>Test was performed at 100% SOC.</p> <p>Refer Test Report No. CT0BP5001 dated. 07.01.2020 for Nail Penetration test.</p>



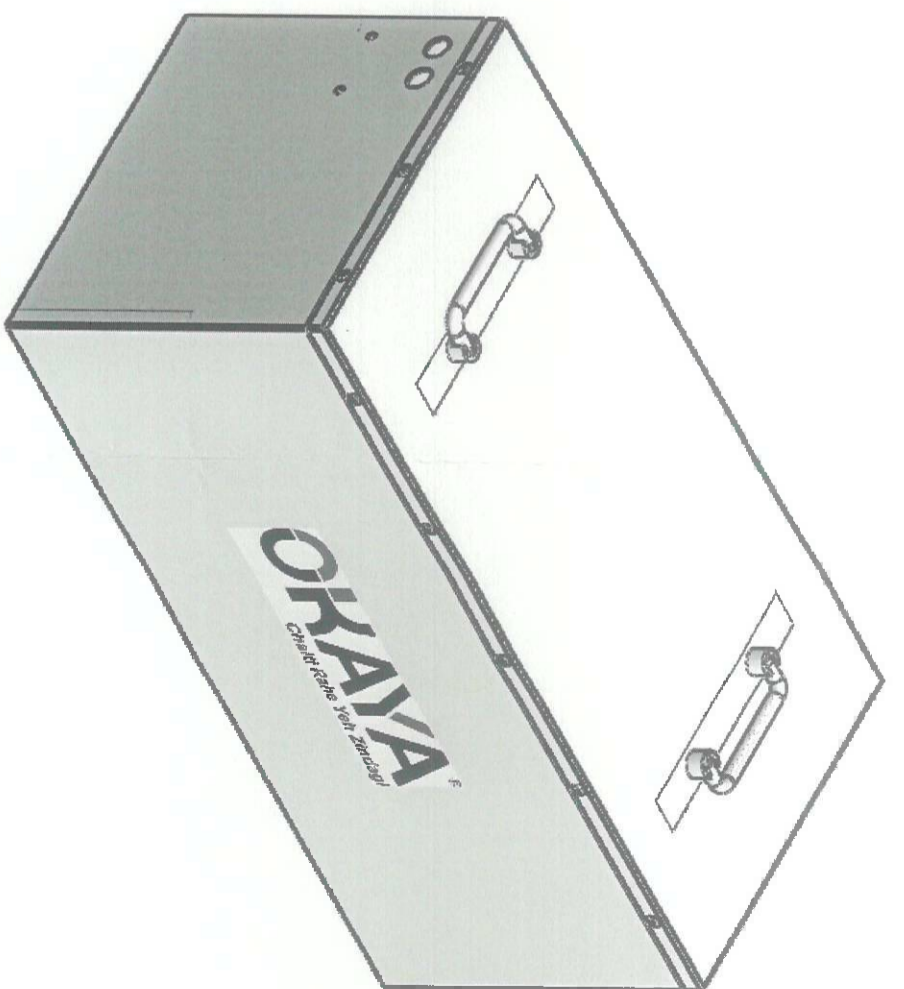
Prepared By		Checked By	<p>Page 05 of 05 + Dwg (01) [124350]</p>
 UDIT KAUL Dy. Manager		 DEVESH PAREEK Manager	



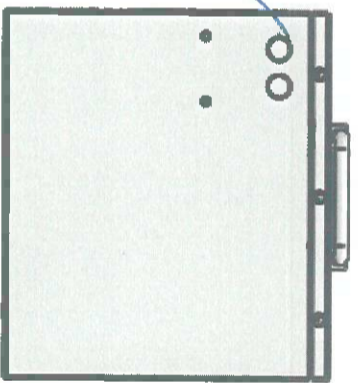
TOP VIEW



FRONT VIEW



ISOMETRIC VIEW



SIDE VIEW

ALL SHARP EDGE SHOULD BE REMOVED.
ALL DIMENSIONS ARE IN MM.

PLEASE DO NOT SCALE THE DRAWING, IF IN DOUBT, ASK.

DIMENSION	0-10	11-50	51-120	121-500	501-1000	1001-2000	2001-3150	>3150	ALL ROUND WELD
FABRICATION (REF: IT 9)	±0.58	±1.2	±1.4	±2.8	±3.6	±6.0	±8.6	±0.3%	FILET WELD
MACHINING REF: IT 12	±0.15	±0.3	±0.35	±0.7	±0.9	±1.5	±2.1	±0.1%	SINGLE V-BUTT WELD SPOT WELD

OKAYA NEVER STOP INDIA		OKAYA POWER GROUP D-7 UDYOG NAGAR		DESIGN	A.R	NAME	A.R	DATE	SIGN.
		PEERAGARHI NEW DELHI-110041		DRAWN	A.R				
TITLE :-		GAD OF 51.2V/160Ah LITHIUM BATTERY		CHKD.	P.S				
CONFIGURATION NAME :-		ASSEMBLY		APPD.	P.S				
CLIENT :-	ALL			SHEET No. :-	01	OF	01	REV.	0
MATERIAL	CRCA	SHEET THICKNESS		DWG.No./PART NO. :-		OPG--002-0619-0006		SHEET SIZE	
SCALE :- NTS				QTY. 01 Nos.				A3	

TRADE NAM - OKAYA
 MODEL NO - LF51160E
 CAPACITY IN 5hr - 160AH
 CELL CONF. - 16S 2P
 CELL CPACITY - 3.2V 80AH
 TYPE BATTERY - LiFePo4

