

INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

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

TEST REPORT (Supplementary Test Report)

Non-Transferable

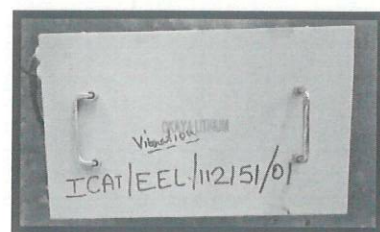
ULR No.:TC536020040000147F
Test Report No.: C T O G P 8 3 1 3

Date: 29.10.2020

- 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. CCTEOKYAPJEEL112151 Dated 07-Aug-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)	100Ah (Ah in 5 hrs)
Battery Pack Rated Voltage	51.2 V DC
Pack Model No.	LFP51100E
Cell Model	IFP40130220-100
Cell Rating	3.2V 100Ah
Configuration of Cells in Pack	16S1P
Cell Manufacture name	HIGHSTAR
Quantity	01 Nos. of Battery pack (ICAT/EEL/112151/01)
Trade Name	OKAYA
Drawing No.	OPG-002-0819-0013-(213M)



4.0 JUSTIFICATION FOR EXTENSION:

Battery mentioned in Sr.no. 3.0 has already been approved as per AIS:048 vide Test report no.CT0B05267 dated. 15.10.2019. 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:24.09.2020

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.


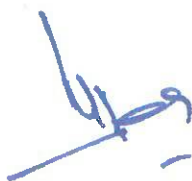

12.0 DATE OF PERFORMANCE OF TEST: Please refer the Annexure-I of this report.

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. CT0B05267 dated 15.10.2019.

Prepared By	Checked By	Approved By
		
UDIT KAUL Dy. Manager	MAHENDAR PAL Asst. General Manager	PAMELA TIKKU Sr. General Manager






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DISCLAIMER

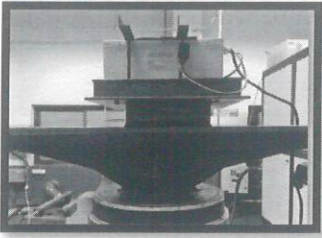
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2. ICAT issues Test reports/ Extension reports/ Developmental Reports in compliance to Motor Vehicle Act/ Central Motor Vehicle Rules and their provisions as amended from time to time or any other statutory orders under which ICAT is authorized. Other Rules/Acts are outside the purview/scope of the Test reports/Extension reports/ Developmental test reports
3. Test(s) on prototype/ vehicle(s)/ sample(s) is/are carried out on the basis of standard procedures as notified under specific rules/ requested by the applicant. Results of such tests are property of bearer of Test Reports/ Extension Reports / Developmental test reports. These results cannot be disclosed unless specifically so ordered by Government, Court, etc
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9. No extract, abridgment or abstraction from this test report may be published or used to advertise the product without the written consent of the Director, ICAT, who reserves the absolute right to agree or reject all or any of the details of any items of publicity for which consent may be sought The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.




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 UDIT KAUL Dy. Manager		 MAHENDAR PAL Asst. General 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 /112151/01) Date of test : 22.10.2020</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 $I = 0.2 \times \text{Battery capacity}(C_5)$</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 20 A and deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p>Satisfactory.</p>

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Cl. No.	Test	Test Description	Observations/Results
2.2.2	<p>Shock test (Test ID:ICAT/ EEL /112151/01) Date of test : 21.10.2020</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 x Battery capacity(C₅)</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 20 A and deterioration observed was not more than 10%.</p> <p>No physical damage or explosion observed.</p> <p>Satisfactory.</p>

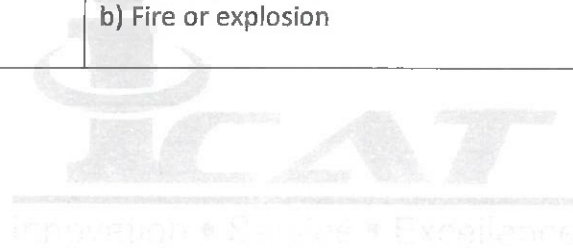
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<p>UDIT KAUL Dy. Manager</p>		<p>MAHENDAR PAL Asst. General Manager</p>




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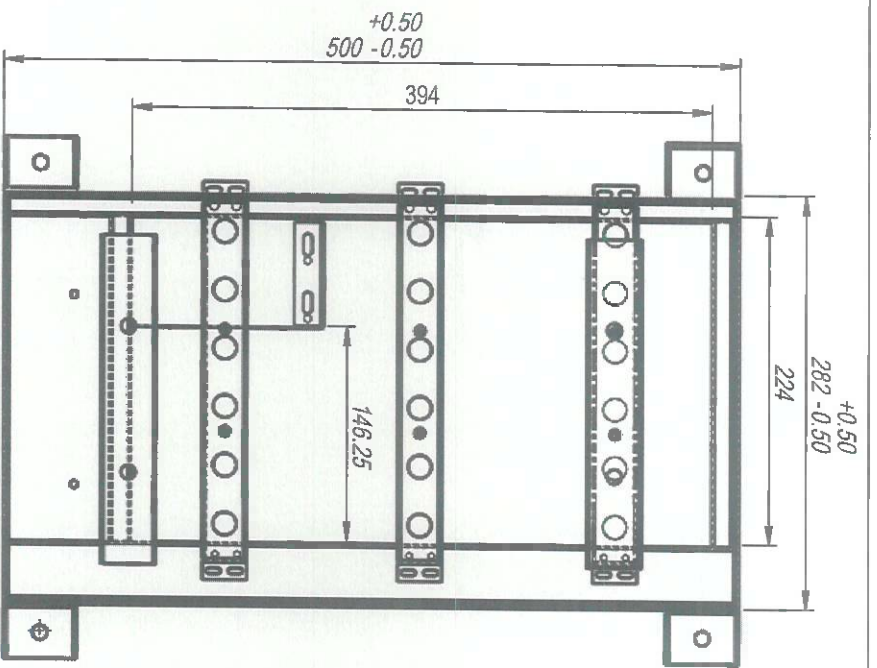
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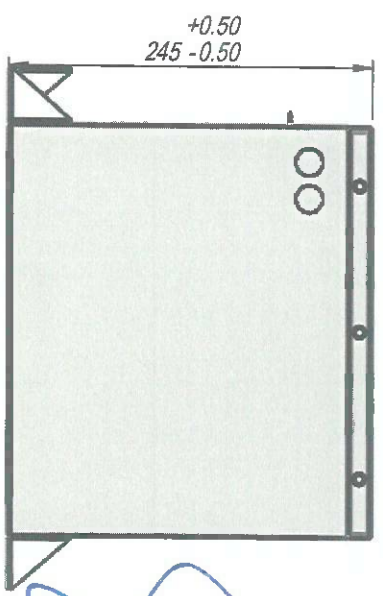
Cl. No.	Test	Test Description	Observations/Results
2.2.4	Nail Penetration	<p>The battery Cell shall be penetrated with a mild steel (conductive) pointed rod, which will be electrically insulated from the test fixture. The test will be carried out with 100% SOC of the Battery cell/Battery pack</p> <p>Rate 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. CT0BO5267 dated 07.01.2020 for Nail Penetration test.</p>



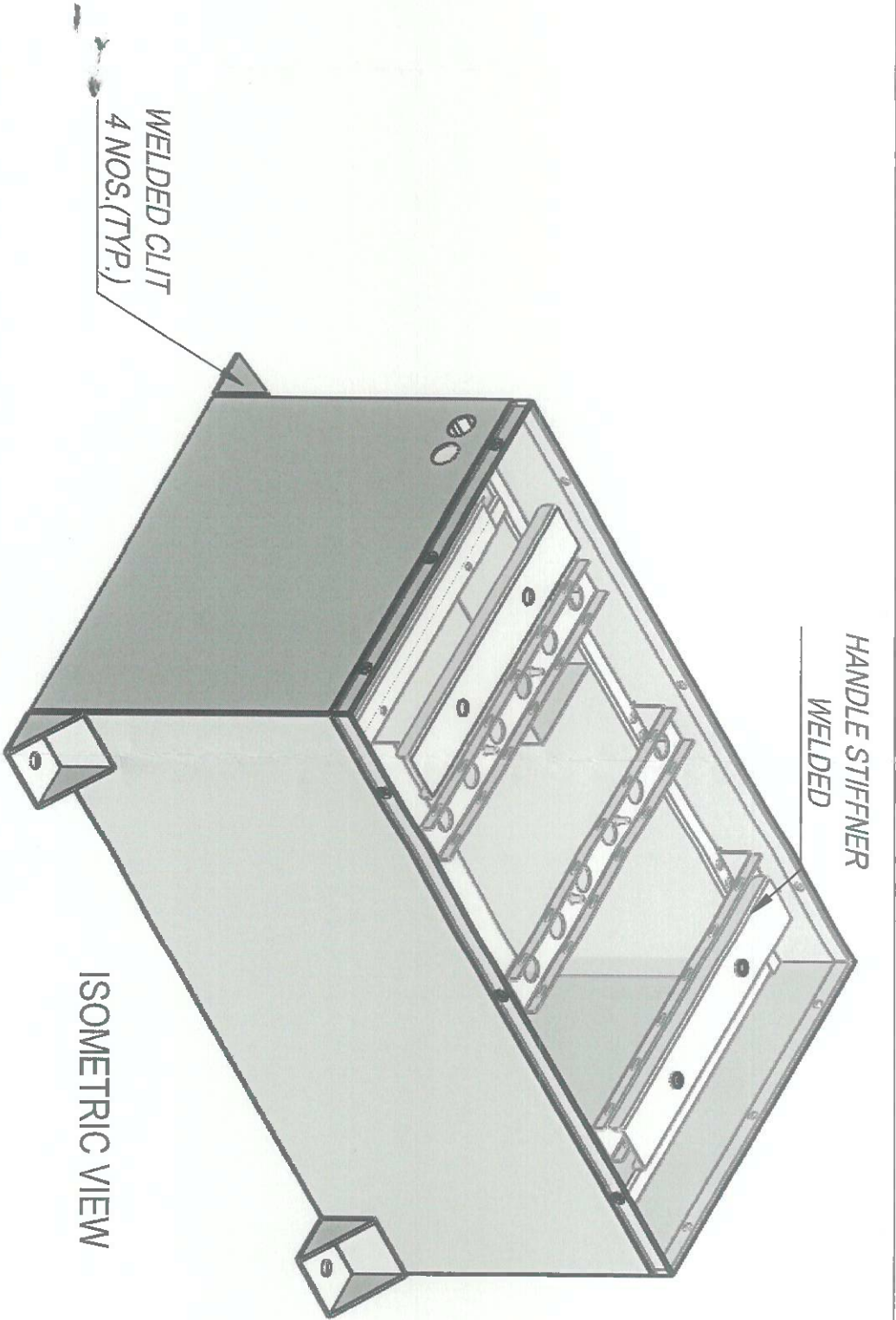
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TOP VIEW



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
FABRICATION (REF:IT-16)	±0.58	±1.2	±1.4	±2.8	±3.6	±6.0	±8.6	±0.3%
MACHINING REF:IT-12	±0.15	±0.3	±0.35	±0.7	±0.9	±1.5	±2.1	±0.1%

OKAYA		OKAYA POWER GROUP D-7 UDYOG NAGAR		PEERAGARHI NEW DELHI-110041	
TITLE :-		GAD		CONFIGURATION NAME :- 51.2V/100Ah (16S/1P)	
CLIENT :-		CRCR	SHEET THICKNESS	QTY.	01 Nos.
MATERIAL		DWG.No./PART NO. :-	OPG-002-0819-0013-(213M)		
SCALE :- NTS		DESIGN	A.R	NAME	DATE
		CHKD.	P.S	DATE	SIGN.
		APPD.	P.S	DATE	SIGN.
		SHEET No. :-		REV.	0

NOTE:-	
Trade Name	Okaya
Model No.	LFP51100E
Rated Voltage	51.2V DC
Capacity in 5h	100Ah
Cell Configuration	16S 1P
Cell Model No.	LFP40130220-100
Cell Mfg. Name	HighStar
Cell Chemistry	LFP

