

TEST REPORT






Non-Transferable

Test Report No.:

C T O G S 9 6 5 5

Date: 17.05.2023

- NAME AND ADDRESS OF THE CUSTOMER** : ESSEL ENERGY INFRA PRIVATE LIMITED
D-48, SECTOR A-2, TRONICA CITY, LONI, GHAZIABAD UTTAR
PRADESH 201102, INDIA
- DESCRIPTION OF VEHICLE UNDER TEST :**
 - Vehicle Category : L1 (Battery operated two wheeler)
 - Vehicle Model : SERF
 - Motor Details : Make: Emf Innovations Pvt. Ltd., Model ID.: BL-12-60-1200
 - Controller Details : Make: Emf Innovations Pvt. Ltd., Model ID.: BH-60-1200
 - Battery Details : Make: Pixcell E-Mobility Private Limited, Model No.: PXL-6060-M1,
Qty: 1 No's, Rating: 59.2V-58Ah, Type: Lithium-ion;
AIS 156(PART II)/2020, amendment 3 phase 2 approved
(ARAI/AED/20222023/3000027300/CT/5513, Dated: 09.03.2023)
 - Charger Details : Make: NEENJAS ELECTRIC, Model : NEV-900NWP-LX-60
 - Chassis No : MD9ESF0123C914001
 - Nominal voltage : 59.2VDC **Operating voltage range: 49.5V-69.5VDC**
- DATE OF RECEIPT OF VEHICLE** : 09.05.2023
- CONDITION OF VEHICLE:** Prototype **Odometer:** 42km
- TEST OBJECTIVE:** To validate the vehicle category L1 (battery operated two wheeler) for construction and functional safety requirements as per AIS-156 (Part-I)/ 2022, amendment 3 phase 1 & 2 published in august 2020 as notified in S.O. 5419(E) dated 27.12.2021 amended in S.O. 4567(E) dated 28.09.2022.
- FUNCTIONAL VERIFICATION:** Protection against water effect (heavy storm rain, washing, flooding) & Physical Verification.
- CONCLUSION:** Vehicle category L1 (Battery operated two wheeler) model "SERF" specified in Sr. No. 2.0 above, submitted by ESSEL ENERGY INFRA PRIVATE LIMITED, meet all the test requirements of construction and functional safety when tested as per -156 (Part-I)/ 2022, amendment 3 phase 1 & 2 published in august 2020.
- DATE OF PERFORMANCE OF TEST:** 11.05.2023 to 15.05.2023
- TEST RESULTS:** Please refer the test requirements and results in Annexure-I of this report.




Prepared By	Checked & Authorized By	Approved By	
			
YOGESH KUMAR Engineer Associate	DEVENDER KUMAR Manager	PRASHANT VIJAY Deputy General manager	
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DISCLAIMER

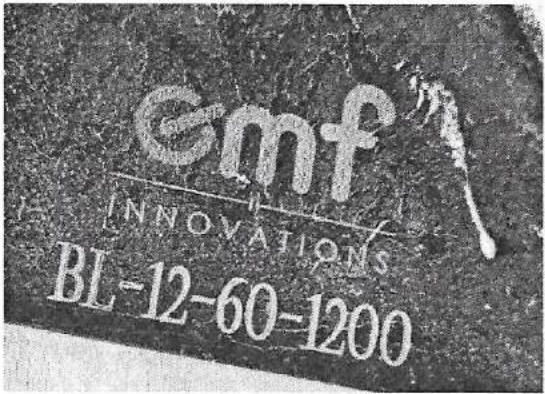

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12. The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.




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YOGESH KUMAR Engineer Associate	DEVENDER KUMAR Manager	Page 2 of 10 [164977]

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10.0 Vehicle's component photographs:

<p style="text-align: center;">MOTOR</p> 	<p style="text-align: center;">CONTROLLER</p> 
<p style="text-align: center;">CHARGER</p> 	<p style="text-align: center;">BATTERY</p> 
<p style="text-align: center;">CHASSIS NUMBER</p> 	

<p style="text-align: center;">Prepared By</p> 	<p style="text-align: center;">Checked By</p> 	 <p style="text-align: center;">Page 3 of 10 [164977]</p>
<p style="text-align: center;">YOGESH KUMAR Engineer Associate</p>	<p style="text-align: center;">DEVENDER KUMAR Manager</p>	


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Date: 17.05.2023

Annexure – I

1.0 TEST REQUIREMENTS AND RESULTS:

Cl. No.	Test Requirements	Observations/Results
5.1 Protection against electrical shock: These electrical safety requirements apply to high voltage buses under conditions where they are not connected to external high voltage power supplies.		
5.1.1.	Protection against direct contact: Protection against direct contact with high voltage live parts is also required for vehicles equipped with any REESS type approved under Part II of this Standard.	Complies
	The protection against direct contact with the live parts, shall comply with paragraphs 5.1.1.1. and 5.1.1.2.	Complies
	These protections (solid insulator, barrier, enclosure, etc.) shall not be able to be opened, disassembled or removed without the use of tools.	Complies
5.1.1.1.	For protection of live parts inside the passenger compartment or luggage compartment, the protection degree IPXXD shall be provided.	Complies
5.1.1.2.	Protection of live parts in areas other than the passenger compartment or luggage compartment	Complies
5.1.1.2.1.	For vehicles with a passenger compartment, the protection degree IPXXB shall be satisfied.	Complies
5.1.1.2.2.	For vehicles without passenger compartment, the protection degree IPXXD shall be satisfied.	Complies
5.1.1.2.3	In case of open vehicles where luggage compartment and passenger compartment are not clearly distinguished, for protection of live parts inside areas which can be accessed only with use of tools, the protection degree IPXXB shall be provided and for other live parts protection degree IPXXD shall be provided.	Complies.
	Note: Accessing an area by opening a lock with a key is not considered as using a tool.	
5.1.1.3.	Connectors	Complies
	Connectors (including vehicle inlet) are deemed to meet this requirement if:	
	(a) They comply with 5.1.1.1. and 5.1.1.2. when separated without the use of tools; or	
	(b) They are located underneath the floor and are provided with a locking mechanism;	
	(c) They are provided with a locking mechanism and other components shall be removed with the use of tools in order to separate the connector; or	
(d) The voltage of the live parts becomes equal or below 60 V DC or equal or below 30 V AC (rms) within one second after the connector is separated.		
5.1.1.4	Service disconnect For a service disconnect which can be opened, disassembled or removed without tools, it is acceptable if protection degree IPXXB is satisfied under a condition where it is opened, disassembled or removed without tools.	Complies
5.1.1.5.	Marking	Complies
5.1.1.5.1	In the case of a REESS having high voltage capability the symbol shown in Figure 1 shall appear on or near the REESS. The symbol background shall be yellow, the bordering and the arrow shall be black.  Figure 1 Marking of high voltage equipment	




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YOGESH KUMAR Engineer Associate	DEVENDER KUMAR Manager	

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Annexure – I (contd.)

Cl. No.	Test Requirements	Observations/Results
5.1.1.5.2.	The symbol shall also be visible on enclosures and barriers, which, when removed expose live parts of high voltage circuits. This provision is optional to any connector for high voltage buses. This provision shall not apply to any of the following cases: (a) Where barriers or enclosures cannot be physically accessed, opened, or removed; unless other vehicle components are removed with the use of tools; (b) Where barriers or enclosures are located underneath the vehicle floor.	Complies
5.1.1.5.3.	Cables for high voltage buses which are not located within enclosures shall be identified by having an outer covering with the colour orange.	It is not high voltage bus. Not Applicable
5.1.2.	Protection against indirect contact Protection against indirect contact is also required for vehicles with high voltage live parts equipped with any REESS type approved under Part II of this Standard.	Complies
5.1.2.1.	For protection against electrical shock which could arise from indirect contact, the exposed conductive parts, such as the conductive barrier and enclosure, shall be galvanically connected securely to the electrical chassis by connection with electrical wire or ground cable, or by welding, or by connection using bolts, etc. so that no dangerous potentials are produced.	Complies
5.1.2.2.	The resistance between all exposed conductive parts and the electrical chassis shall be lower than 0.1 Ω when there is current flow of at least 0.2 A. This requirement is satisfied if the galvanic connection has been established by welding.	Complies
5.1.2.3.	In the case of motor vehicles which are intended to be connected to the grounded external electric power supply through the conductive connection, a device to enable the galvanical connection of the electrical chassis to the earth ground shall be provided. The device shall enable connection to the earth ground before exterior voltage is applied to the vehicle and retain the connection until after the exterior voltage is removed from the vehicle. Compliance to this requirement shall be demonstrated either by using the connector specified by the vehicle manufacturer, or by analysis.	Complies
5.1.2.4.	The requirement of paragraph 5.1.2.3. above shall not apply to the vehicles which satisfy (a) or (b) below: (a) The vehicle's REESS can be charged via the external electric power supply only by using an off-board charger with a double insulation or reinforced insulation structure between input and output. The performance requirements regarding the previously mentioned insulation structure shall comply with the following requirements of paragraph 5.1.2.4.1. and paragraph 5.1.2.4.3. and stated in its documentation. (b) The on-board charger has a double or reinforced insulation structure between input and the vehicle's exposed conductive parts/electrical chassis. The performance requirements regarding the previously mentioned insulation structure shall comply with the following requirements of paragraphs 5.1.2.4.1., 5.1.2.4.2. and 5.1.2.4.3. If both systems are installed (a) and (b) have to be fulfilled.	Complies No on-board charger Not Applicable
5.1.2.4.1.	Withstand voltage	
5.1.2.4.1.1.	For vehicle with on-board charger the test shall be conducted according to Annex 9A to this standard.	Not Applicable



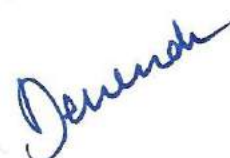
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Annexure – I (contd.)

Cl. No.	Test Requirements	Observations/Results
5.1.2.4.1.2.	Acceptance criteria The insulation resistance shall be equal to or greater than 7 MΩ when applying 500 V DC between all the inputs connected together and the vehicle's exposed conductive parts/electrical chassis.	Not Applicable
5.1.2.4.2.	Protection against ingress of water	Not Applicable
5.1.2.4.2.1.	This test shall be conducted according to Annex 9B of this standard.	Not Applicable
5.1.2.4.2.2.	Acceptance Criteria The insulation resistance shall be equal to or greater than 7 MΩ, when applying 500 V DC.	Not Applicable
5.1.2.4.3.	Handling instructions Appropriate instructions for charging shall be provided and included in the manual! Also, do not use the battery nor the vehicle and ask your original vehicle manufacturer authorized representative to take (appropriate) measures."	Complies
5.1.3.	Isolation resistance This paragraph shall not apply to chassis connected electrical circuits where the maximum voltage between any live part and the electrical chassis or any exposed conductive part does not exceed 30 V AC (rms) or 60 V DC.	Complies
5.1.3.1.	Electric power train consisting of separate Direct Current- or Alternating Current-buses If AC buses and DC buses are galvanically isolated from each other, the isolation resistance between the high voltage bus and the electrical chassis shall have a minimum value of 100 Ω/V of the working voltage for DC buses, and a minimum value of 500 Ω/V of the working voltage for AC buses. The measurement shall be conducted according to Annex 5A "Isolation resistance measurement method for vehicle based tests".	Not Applicable
5.1.3.2.	Electric power train consisting of combined DC- and AC-buses If AC buses and DC buses are galvanically connected, isolation resistance between any high voltage bus and the electrical chassis shall have a minimum value of 500 Ω/volt of the working voltage. However, if all AC high voltage buses are protected by one of the two following measures, isolation resistance between any high voltage bus and the electrical chassis shall have a minimum value of 100 Ω/V of the working voltage: (a) Double or more layers of solid insulators, barriers or enclosures that meet the requirement in paragraph 5.1.1. independently, for example wiring harness; (b) Mechanically robust protections that have sufficient durability over vehicle service life such as motor housings, electronic converter cases or connectors; (1) Example of the content in the manual: "If during charging, your vehicle or charger becomes submerged in water you should not touch either the vehicle nor the charger because of danger of electric shock. The isolation resistance between the high voltage bus and the electrical chassis may be demonstrated by calculation, measurement or a combination of both. The measurement shall be conducted according to Annex 5A "Isolation resistance measurement method for vehicle based tests".	Not Applicable




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Cl. No.	Test Requirements	Observations/Results
5.1.3.3.	<p>Fuel cell vehicles If the minimum isolation resistance requirement cannot be maintained over time, then protection shall be achieved by any of the following: (a) Double or more layers of solid insulators, barriers or enclosures that meet the requirement in paragraph 5.1.1. independently; (b) On-board isolation resistance monitoring system together with a warning to the driver if the isolation resistance drops below the minimum required value. The isolation resistance between the high voltage bus of the coupling system for charging the REESS and the electrical chassis need not be monitored, because the coupling system for charging is only energized during charging of the REESS. The function of the on-board isolation resistance monitoring system shall be confirmed as described in Annex 6.</p>	Not Applicable
5.1.3.4.	<p>Isolation resistance requirement for the coupling system used to charge the REESS For the coupling system (used to charge the REESS and intended to be conductively connected to the grounded external AC power supply) the isolation resistance shall be at least 1 MΩ when the charger coupler is disconnected. During the measurement, the REESS may be disconnected</p>	Complies
5.2.	REESS	
5.2.1.	For a vehicle with a REESS, the requirement of either paragraph 5.2.1.1. or paragraph 5.2.1.2. shall be satisfied.	Complies
5.2.1.1.	For a REESS which has been type approved in accordance with Part II of this Standard, installation shall be in accordance with the instructions provided by the manufacturer of the REESS, and in conformity with the description provided in Annex 2 to this Standard.	Complies
5.2.1.2.	The REESS shall comply with the respective requirements of paragraph 6. of this Standard.	Complies
5.2.2.	<p>Accumulation of gas Spaces for open type traction batteries that may produce hydrogen gas shall be equipped with a ventilation fan, a ventilation duct or any other suitable means to prevent the accumulation of hydrogen gas.</p>	Not Applicable
5.2.3.	<p>Protection against electrolyte spills Vehicles shall foresee that no spilled electrolyte from the REESS and its components shall reach the driver, rider or passenger or any person around the vehicle during normal condition of use and/or functional operation. When the REESS is in the upside-down position, no electrolyte shall spill.</p>	Complies.
5.2.4.	<p>Accidental or unintentional detachment The REESS and its components shall be installed in the vehicle in such a way so as to preclude the possibility of inadvertent or unintentional detachment of the REESS. The REESS in the vehicle shall not be ejected when the vehicle is tilted. The REESS components shall not be ejected when the REESS is put upside-down.</p>	Complies




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Cl. No.	Test Requirements	Observations/ Results
5.3.	Functional safety A momentary indication shall, as minimum, be given to the driver when the vehicle is in "active driving possible mode". However, this provision does not apply under conditions where an internal combustion engine directly or indirectly provides the vehicle's propulsion power. When leaving the vehicle, the driver shall be informed by a signal (e.g. optical or audible signal) if the vehicle is still in the active driving possible mode.	Complies
	If the onboard REESS can be externally charged by the user, movement caused by the vehicle's propulsion system shall not be possible while the external electric power supply is physically connected to the vehicle inlet.	
	For vehicles with a permanently connected recharge cable, the requirement above is not applicable if using the cable to charge the vehicle prevents the use of the vehicle (e.g. seat cannot be closed, the cable position does not allow the rider to sit in or step into the vehicle). This requirement shall be demonstrated by using the connector specified by the vehicle manufacturer. The state of the drive direction control unit shall be identified to the driver.	
	5.3.1. Additional functional safety requirements	
	5.3.1.1. At least two deliberate and distinctive actions shall be performed by the driver at the start-up to select the active driving possible mode.	
5.3.1.2. Only a single action shall be required to deactivate the active driving possible mode.	Complies	
5.3.1.3. Indication of temporary reduced power (i.e. not resulting from a failure) and/or of state of charge (SOC) of REESS.	Complies	
5.3.1.3.1. The vehicle shall have a function/device that indicates to the driver/rider if the power is automatically reduced below a certain level, (e.g. due to activation of the output controller to protect the REESS or the propulsion system) or due to a low SOC.	Complies	
5.3.1.3.2. The conditions under which these indications are given shall be determined by the manufacturer. A brief description of the power reduction and indicating strategy will be prescribed in Annex 1 clause no 8.4.1 and 8.4.2.	Complies	
5.3.1.4. Driving or riding backwards It shall not be possible to activate the vehicle reverse control function whilst the vehicle is in forward motion.	Complies	
5.3.1.5. There shall also be an optical / visual indication to the driver when state of charge of the REESS reaches a level where re-charging is recommended, this indication shall remain ON, even if the vehicle is restarted, till the vehicle is charged above the charge level where recharging is recommended. In case vehicle has an indicator or display which shows continuously the state-of-charge(SOC)level of REESS to the driver, the provision of indication mentioned in this clause is optional.	Complies	
5.4. Determination of hydrogen emissions		
5.4.1. This test shall be carried out on all vehicles equipped with open type traction batteries. If the REESS has been approved under Part II of this Standard and installed in accordance with paragraph 5.2.1.1., this test can be omitted for the approval of the vehicle.	Not Applicable	
5.4.2. The test shall be conducted according to the method in Annex 7 of the present Standard. The hydrogen sampling and analysis shall be prescribed. Other analysis methods can be approved if it is proven that they give equivalent results.	Not Applicable	




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Cl. No.	Test Requirements	Observations/ Results
5.4.3.	During a normal charge procedure in the conditions given in Annex 7, hydrogen emissions shall be below 125 g during 5 h, or below 25 x t2 g during t2 (in h).	Not Applicable
5.4.4.	During a charge carried out by a charger presenting a failure (conditions given in Annex 7), hydrogen emissions shall be below 42 g. The charger shall limit such a failure to 30 minute maximum.	Not Applicable
5.4.5.	All the operations linked to the REESS charging shall be controlled automatically, including the stop for charging.	Complies
5.4.6.	Manual control of the charging phases shall not be possible.	Complies
5.4.7.	Normal operations of connection and disconnection to the mains or power cuts shall not affect the control system of the charging phases.	Complies
5.4.8	Important charging failures shall be permanently indicated. An important failure is a failure that can lead to a malfunction of the charger during charging later on.	Complies
5.4.9.	The manufacturer shall indicate, the vehicle's conformity in the owner's manual to these requirements.	Complies
5.4.10.	The approval granted to a vehicle type relative to hydrogen emissions can be extended to different vehicle types belonging to the same family, in accordance with the definition of the family given in Annex 7, Appendix 2.	Not Applicable
5.5	Protection against Water Effects The test as per 5.5.1, 5.5.2 and 5.5.3 shall be performed. After each exposure (vehicles still wet), the vehicle shall then comply with the isolation resistance test with at least 100 Ω/V of nominal voltage, but keeping the power equipment connected to the REESS (main switch closed), and before water test isolation resistance with at least 500 Ω/V of nominal voltage. These tests shall not apply to vehicles having chassis connected electrical circuits where the maximum voltage between any live part and the electrical chassis or any exposed conductive part does not exceed 30V AC (rms) or 60 V DC.	Complies
	Washing This test is intended to simulate a normal washing of Electric Power Train vehicles, but not specific cleaning using high water pressure or underbody washing. The vehicle manufacturer shall specify detailed conditions for such specific cleaning or washing in the owner's manual. The critical areas of the vehicle regarding this test are border lines i.e. a seal of two parts as flaps, glass seals, outline of opening parts, outline of front grille, seals of lamps. 5.5.1 In the case of open vehicles such as 3-wheelers without doors and windows, or 2-wheelers etc the manufacturer shall specify the procedure for normal washing also. In such cases, the washing test shall be conducted by taking into account the above recommendation. The test uses a hose nozzle according to IPX5 as specified in IEC 60529 (Refer Annex-9B Figure 1 for details). Using fresh water with a flow rate of 12.5 l/min, all borderlines shall be exposed and followed in all directions with the water stream at a speed rate of 0.1 m/s, keeping a distance of 3 m between the nozzle aperture and the borderline.	
5.5.2	Flooding This test is intended to simulate the driving of an Electric Power Train vehicles on flooded streets or in water puddles. The vehicle shall be driven in a wade pool, 10 cm in depth, over a distance of 500 m at a speed of 20 km/h resulting in a time of approximately 1.5 min. If the wade pool used is less than 500 m in length, so that it has to be driven through several times, the total time including the periods outside the wade pool shall be less than 10 min.	Test performed as per requirement Complies

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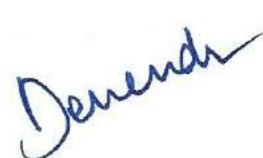
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Annexure – I (contd.)

Cl. No.	Test Requirements	Observations/Results
5.5.3	Heavy Rainstorm	Test performed as per requirement Complies
	This test is intended to simulate a sudden heavy rainstorm e.g. a thunderstorm, when opening parts especially to access to the passenger, load and motor compartments are open except those requiring one or more tools.	
	In case of voltage class B equipment shielded from exposure to water, this test of the whole vehicle may be replaced by equivalent tests on the components individually.	
	The critical areas of the vehicle regarding this test are those accessible with opened opening parts. This test uses a spray nozzle according to IPX3 as specified in IEC 60529.	
	Using fresh water with a flow rate of 10 l/min, all surfaces with normally open opening parts shall be exposed for 5 min, possibly through a regular movement of the spray nozzle.	
	Note: Voltage class B equipment is an equipment with nominal voltage (U)	
	DC: 60 V < U <= 1500 V	
	AC: 30 V rms < U <= 1000 V rms – 15 to 150 Hz	



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ULR No. TC536023150000262F

C T O P S 0 4 7 0

Date - 24th Mar 2023

TEST REPORT TYPE APPROVAL				
Manufacturer		Objective of the test		
M/s Essel Energy Infra Private Limited Plot No. 55, Sector- 34, Gurgaon, Haryana, 122001		To conduct type approval tests as per AIS-039-Rev 01:2015(Amd-01), AIS-040-Rev 01:2015(Amd-02)		
Test vehicle	Battery Operated Vehicle 2W (more than 250W) L1 Category			
Vehicle Model	SERF			
Test Request	164977; Date:- 28 th Feb 2023	Vehicle Received at VTL	20-Mar-23	
Frame No.	MD9ESF0123C914001	Unladen Weight (kg)	95	
Road Load Equation F=N, V=km/h	$F = 15.0 + 0.0226 v^2 + 170 dv/dt$	Equivalent Inertia (kg)	170	
Coast down report No.	As per part XIII of MoRTH/CMVR/TAP-115/116 (Amendment No. 1).			
Traction Battery	Make	M/s Pixcell E-Mobility Pvt. Ltd.	Type	Lithium ion
	ID	PXL - 6060 - M1	Nominal Volts (V)	59.2
Traction Motor	Make	M/s Emf Innovations Pvt. Ltd.		
	ID	BL-12-60-1200		
Power controller	Make	M/s Emf Innovations Pvt. Ltd.		
	ID	BH-60-1200	Rating	60V / 40A
Charger	Make	M/s Neenjas Electric	Nominal volts (V) / frequency (Hz)	90-280 / 47-63
	ID	NEV-900NWP-LX-60		
Battery Management System(BMS)	Make	M/s Pixcell E-Mobility Pvt. Ltd.		
	ID	PXL-E001-CAN		
Test Procedure	As per AIS-039-Rev 01:2015(Amendment-1), AIS-040-Rev 01:2015(Amendment-2).			
Test Equipment	Make	Type		
Chassis Dyno	AVL Zöllner GmbH,GMBH	955 mm Compact Chassis Dyno		
Cooling Fan	AVL Zöllner GmbH,GMBH	Air Stream Fan		
Driver Aid	AVL Zöllner GmbH,GMBH	--		

Prepared By	Checked & Authorized By	Approved By
 RAJAT KUMAR Engineer	 MONAL HASTI Manager	 VIKAS SADAN Dy. General Manager
		




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Date – 24th Mar 2023

Test Results			
Test Procedure	Test Date	Type of test	Measured Value
AIS-039-Rev 01:2015	22-Mar-23	Electrical Energy Consumption	31 Wh/km
			3.127 kWh/100km
AIS-040-Rev 01:2015	23-Mar-23	Range Test	150 km
Remarks:	1. The tests were conducted as per the requirements of AIS-039-Rev 01:2015 (Amendment-1), AIS-040-Rev 01:2015 (Amendment-2).		
	2. For Power test refer report No. ARAI/AED/20212022/3000021407/CT/1801 Date:- 26.02.2022		
	3. Test was conducted at ICAT Centre 1, Manesar.		
CONDITION OF ISSUE:			
<p>1. ICAT issues Test Reports/ Extension Reports/ Developmental Test Reports for vehicles /components/parts/ assemblies etc. based on the documents produced and/or prototype / vehicle(s) or sample(s) submitted by the applicant and testing thereof. The test results in the report relate only to the items tested.</p> <p>2. ICAT issues Test Reports/ Extension Reports/ Developmental Test 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</p> <p>3. Test(s) on prototype /vehicle(s) or 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 ordered so by Government, Court, etc.</p> <p>4. ICAT is responsible only for the test results provided in the report. ICAT is not responsible for the information supplied by the customer and its impact on the test results thereof.</p> <p>5. Where applicable, ICAT provides statement of conformity based on ISO/IEC Guide 98-4 in reports issued.</p> <p>6. Unless otherwise supported by a separate Certificate, this Test Reports/ Extension Reports/ Developmental Test Reports shall not be considered in isolation as valid Type approval for any vehicle.</p> <p>7. ICAT is not responsible for testing each vehicles/components/parts/assemblies etc. for which Test Reports/ Extension reports/ Developmental test reports is issued. Further, ICAT is not responsible for ensuring manufacturing quality of the vehicles/ components/ parts/ assemblies etc. for which the Test Reports/ Extension reports/ Developmental test reports is /are issued.</p> <p>8. ICAT is in no way responsible for any misuse or copying of any design/type/system in connection with entire vehicle/ components/parts and assemblies covered under the Test Reports/ Extension reports/ Developmental test reports is /are issued.</p> <p>9. Breach of any statutory provisions, of Indian laws or laws of other countries, will be sole responsibility of the bearer of Test Reports/ Extension Reports / Developmental reports is/are issued and ICAT shall not be liable for any claims or damages, whatsoever. The bearer shall alone be liable for the same and shall undertake to indemnify ICAT in this regard.</p> <p>10. Further, ICAT has the right, but not under obligation to initiate cancellation / withdrawal of the Test Reports/ Extension Reports/ Developmental Test Reports is/are issued in case of any fraud, misrepresentation, when it surfaces and comes in the knowledge of ICAT.</p> <p>11. 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.</p> <p>12. The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.</p>			

Prepared By		Checked & Authorized By	
			
RAJAT KUMAR		MONAL HASTI	
Engineer		Manager	Page 2 of 2. [164977]



ULR No. TC536023150000262F

C T O P S 0 4 7 0

Date – 24th Mar 2023

TEST REPORT TYPE APPROVAL				
Manufacturer		Objective of the test		
M/s Essel Energy Infra Private Limited Plot No. 55, Sector- 34, Gurgaon, Haryana, 122001		To conduct type approval tests as per AIS-039-Rev 01:2015(Amd-01), AIS-040-Rev 01:2015(Amd-02)		
Test vehicle	Battery Operated Vehicle 2W (more than 250W) L1 Category			
Vehicle Model	SERF			
Test Request	164977; Date:- 28 th Feb 2023	Vehicle Received at VTL	20-Mar-23	
Frame No.	MD9ESF0123C914001	Unladen Weight (kg)	95	
Road Load Equation F=N, V=km/h	F = 15.0 + 0.0226 v ² +170 dv/dt	Equivalent Inertia (kg)	170	
Coast down report No.	As per part XIII of MoRTH/CMVR/TAP-115/116 (Amendment No. 1).			
Traction Battery	Make	M/s Pixcell E-Mobility Pvt. Ltd.	Type	Lithium ion
	ID	PXL - 6060 - M1	Nominal Volts (V)	59.2
Traction Motor	Make	M/s Emf Innovations Pvt. Ltd.		
	ID	BL-12-60-1200		
Power controller	Make	M/s Emf Innovations Pvt. Ltd.		
	ID	BH-60-1200	Rating	60V / 40A
Charger	Make	M/s Neenjas Electric	Nominal volts (V) / frequency (Hz)	90-280 / 47-63
	ID	NEV-900NWP-LX-60		
Battery Management System (BMS)	Make	M/s Pixcell E-Mobility Pvt. Ltd.		
	ID	PXL-E001-CAN		
Test Procedure	As per AIS-039-Rev 01:2015(Amendment-1), AIS-040-Rev 01:2015(Amendment-2).			
Test Equipment	Make	Type		
Chassis Dyno	AVL Zöllner GmbH,GMBH	955 mm Compact Chassis Dyno		
Cooling Fan	AVL Zöllner GmbH,GMBH	Air Stream Fan		
Driver Aid	AVL Zöllner GmbH,GMBH	--		

Prepared By	Checked & Authorized By	Approved By
RAJAT KUMAR Engineer	MONAL HASTI Manager	VIKAS SADAN Dy. General Manager






ULR No. TC536023150000262F

C T O P S 0 4 7 0

Date – 24th Mar 2023

Test Results			
Test Procedure	Test Date	Type of test	Measured Value
AIS-039-Rev 01:2015	22-Mar-23	Electrical Energy Consumption	31 Wh/km
			3.127 kWh/100km
AIS-040-Rev 01:2015	23-Mar-23	Range Test	150 km
Remarks:	1. The tests were conducted as per the requirements of AIS-039-Rev 01:2015 (Amendment-1), AIS-040-Rev 01:2015 (Amendment-2).		
	2. For Power test refer report No. ARAI/AED/20212022/3000021407/CT/1801 Date:- 26.02.2022		
	3. Test was conducted at ICAT Centre 1, Manesar.		
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Prepared By		Checked & Authorized By	Page 2 of 2 [164977]
			
RAJAT KUMAR Engineer		MONAL HASTI Manager	

अंतर्राष्ट्रीय ऑटोमोटिव प्रौद्योगिकी केन्द्र
INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

TC-5360

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

ULR No.: TC536023140000261F

C T O V S 0855

Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Objective	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Method	As per respective standards.
8	Conclusion	Vehicle meets the compliance requirements of respective standards
9	Place of Issue	ICAT Centre II
10	Total No. of pages	08 + 01 Drawing

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 08 of 08 for Disclaimer.

Prepared By	Checked & Authorized By	Approved By	
			
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	Keshav Kr. Tripathi Asst. General Manager	
			Page 01 of 08 + 01 Dwg.

Office Address : Centre-I : Plot No.-26, Sector-3, HSIIDC, IMT-Manesar, Gurugram-122050. Haryana (India)

Centre-II : Plot No.-01, Sector-M-11, HSIIDC, IMT-Manesar, Gurugram-122050. Haryana (India)

Phone : 0124-4586111, Fax : +91-124-2290005. E-mail: team@icat.in, Website : www.icat.in

(An ISO 9001, ISO 14001 and ISO 45001 certified, scope wise NABL accredited and BIS recognised Test House)

ULR No.: TC536023140000261F

C T O V S 0855

Date : 26 May 2023




PERFORMANCE TEST (CMVR) REPORT
SERF

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No	MD9ESF0123C914001	Date of Performance of Test	27 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Rule No.	PARAMETER	TEST RESULTS							
96(4)	Test Description:- Brake Test (IS 14664:2010)								
	Dynamic Test - Front Brake Only	Vehicle Speed	Control Force	Stopping Distance (m)		MFDD (m/s ²)		Service brake, Front brake, Type of brake - Drum Total Braking Area (cm ²) - 59.66 Make of Liner - M/s Jayna Magnum Liner Material - Non Asbestos Id. Observed - JMC2 Measured Dim.(mm) - 120.4 x 24.8 x 3.8 Brake Drum Diameter (mm) - 130 Brake System layout - Refer Drawing no. 01 of this report. Rear brake, Type of brake - Drum Total Braking Area (cm ²) - 65.35 Make of Liner - M/s Jayna Magnum Liner Material - Non Asbestos Id. Observed - JMC3 Measured Dim.(mm) - 115.2 x 28.4 x 3.9 Brake Drum Diameter (mm) - 130 Brake System layout - Refer Drawing no. 01 of this report. Battery, Make - M/s Pixcell E-Mobility Pvt. Ltd. Capacity - 58.0 Ah Nominal Voltage - 59.2 V Id/Model no. - PXL - 6060 - M1 Wheel Base (mm) - 1360 Measured Maximum Speed, km/h - 52.13 Tyres, Front - JK TYRE 90/90-12 54J Rear - JK TYRE 90/90-12 54J Tyre Pressure(kPa), Front - 250 and Rear - 250 (Unladen & Laden) 1 - Not applicable as per Clause no. 5.6.1(c) of IS 14664:2010. 2 - Not applicable as per Clause no. 5.5.1(b) of IS 14664:2010. Test conducted for introduction of new model. Case of new type approval.	
		(km/h)	(N)	Observed	Limit	Observed	Limit		
	Type 'P' Test	Lightly Loaded	46.9	137.3	17.2	23.8	6.1		4.4
		Laden	46.9	151.4	19.4	23.8	4.7		4.4
		Hot performance after fade - Laden	46.9	137.3	17.5	29.3	5.2		2.8
		Wet recovery ¹	/		Deceleration during initial 0.5-1s after brake actuation (m/s ²)	Max. deceleration of complete stop excluding final 0.5s (m/s ²)			
		Vehicle - Lightly Loaded	NA	NA	NA	NA	NA		NA
		Vehicle - Laden	NA	NA	NA	NA	NA		NA
		Dynamic Test - Rear Brake Only	Vehicle Speed	Control Force	Stopping Distance (m)		MFDD (m/s ²)		
			(km/h)	(N)	Observed	Limit	Observed		Limit
		Type 'P' Test	Lightly Loaded	46.9	112.8	21.0	34.0	4.1	2.9
			Laden	46.9	172.2	22.8	34.0	4.0	2.9
			Hot performance after fade - Laden	46.9	141.9	23.9	34.9	3.9	2.4
		Wet recovery ¹	/		Deceleration during initial 0.5-1s after brake actuation (m/s ²)	Max. deceleration of complete stop excluding 0.5s (m/s ²)			
		Vehicle - Lightly Loaded	NA	NA	NA	NA	NA	NA	
		Vehicle - Laden	NA	NA	NA	NA	NA	NA	
		Dynamic Test - CBS control actuated	Vehicle Speed	Control Force	Stopping Distance (m)		MFDD (m/s ²)		
			(km/h)	(N)	Observed	Limit	Observed	Limit	
			Vehicle - Lightly Loaded	46.9	148.6	20.8	21.4	7.4	5.1
		Vehicle - Laden	46.9	180.4	17.0	21.4	5.4	5.1	
	Dynamic Test - Both brake controls actuated	Initial Speed	Control Force	Stopping Distance (m)		MFDD (m/s ²)			
		(km/h)	(N)	Observed	Limit	Observed	Limit		
		Vehicle - Lightly Loaded	46.9	F - 159.0 R - 173.2	12.1	13.2	--	--	
	Dynamic Test - High Speed Test - Both Brake Controls Actuated²	Vehicle Speed	Control Force	Stopping Distance (m)		MFDD (m/s ²)			
		(km/h)	(N)	Observed	Limit	Observed	Limit		
		Vehicle - Lightly Loaded	NA	NA	NA	NA	NA		

Formal No. ICAT/VELJF/83/00

Prepared by	Checked & Authorized By	 Page 02 of 08 + 01 Dwg.
		
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	

ULR No.: TC536023140000261F

C T O V S 0855




Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.	PARAMETER	TEST RESULTS		
120	<p>Noise Level Measurement</p> <p>Test Description:- Passby Noise Level, (IS 3028:1998)</p>	<p>Approach Speed</p> <p>Test conducted at approach speed of 39.1 km/h.</p>	<p>Measured Value</p> <p>58 dB(A)</p>	<p>Limit as per GSR 111 (E) Date - 10/02/2004</p> <p>75 dB(A)</p>
<p>Transmission, Type - Direct transmission by the hub motor Motor, Make - M/s EMF Innovations Pvt. Ltd. Type - BLDC Max power (kW) - 2.6 Battery, Make - M/s Pixcell E-Mobility Pvt. Ltd. Capacity - 58.0 Ah Nominal Voltage - 59.2 V Id/Model no. - PXL - 6060 - M1 Controller, Make - M/s EMF Innovations Pvt. Ltd. Id/Model - BH-60-1200 Tyres, Front - JK TYRE 90/90-12 54J Rear - JK TYRE 90/90-12 54J Tyre Pressure(kPa), Unladen Front - 250 and Rear - 250</p> <p>Test conducted for introduction of new model. Case of New Type Approval.</p>				
Format No.: ICAT/VELF/07/01				

Prepared By	Checked & Authorized By	 <p>Page 03 of 08 + 01 Dwg.</p>
		
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	

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ULR No.: TC536023140000261F


C T O V S 0855

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.	PARAMETER	TEST RESULTS				
117	Speedometer Calibration (IS 11827:2008) 	Indicated Speed, km/h	Actual Speed, km/h	Error km/h	Permissible Error, km/h	Speedometer, Make - M/s AUTO WIRES PVT. LTD. Type - Digital Range, km/h - 0-99 Speedometer ratio - 1:1 Overall transmission Ratio of drive mechanism or pulse/rev - 2:1 Identification/Model - AWCT-01 Resolution, km/hr - 1 Measured Max. Speed, km/h - 52.13 Tyres, Front - JK TYRE 90/90-12 54J Rear - JK TYRE 90/90-12 54J Tyre Pressure(kPa), Unladen Front - 250 and Rear - 250 Test conducted for introduction of new model. Case of new type approval.
		40.0	37.1	2.9	7.7	

Format No.: ICAT/VEL/F/13/01

Prepared By

Checked & Authorized By





Rahul Upadhyay
Asst. Manager

Karan Mahajan
Dy. Manager

ULR No.: TC536023140000261F

C T 0 V S 0855

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	29 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.	PARAMETER	TEST RESULTS		
		Specified	Achieved	Limit
124 (1) (23)	Gradeability (AIS:003-1999)	7°	7°	7°

Transmission,
Type - Direct transmission by the hub motor
Overall 1st gear ratio - NA
Battery,
Make - M/s Pixcell E-Mobility Pvt. Ltd.
Capacity - 58.0 Ah
Nominal Voltage - 59.2 V
Id/Model no. - PXL - 6060 - M1
Tyres,
Front - JK TYRE 90/90-12 54J
Rear - JK TYRE 90/90-12 54J
Tyre Pressure(kPa), Laden
Front - 250 and Rear - 250

Test conducted for introduction of new model. Case of new type approval.

Format No.: ICAT/VEL/F/10/01

Prepared By

Checked & Authorized By




Rahul Upadhyay
Asst. Manager

Karan Mahajan
Dy. Manager



ULR No.: TC536023140000261F

C T O V S 0855

Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT SERF

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Rule No.	PARAMETER	TEST RESULTS			
-	Weight Measurement			Format No.: ICAT/VEL/F/12/01	
	Unladen without Battery		Specified		Measured
	FAW , kg		--		32.0
	RAW , kg		--		43.0
	Total weight , kg		--		75.0
	Unladen		Specified		Measured
	FAW , kg		38.0		38.0
	RAW , kg		60.0		60.0
	Total weight , kg		98.0		98.0
	Lightly Loaded with instruments		Specified		Measured
	FAW , kg		--		67.0
	RAW , kg		--		106.0
	Total weight , kg		--		173.0
	Laden		Specified		Measured
	FAW , kg		85.0		85.0
	RAW , kg		163.0		163.0
Total weight , kg		248.0	248.0		

Prepared By



Rahul Upadhyay
Asst. Manager

Checked & Authorized By



Karan Mahajan
Dy. Manager



ULR No.: TC536023140000261F

C T 0 V S 0855

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	29 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Photographs



Front View





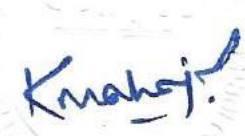
Rear View



Left hand View



Right hand View

Prepared By	Checked & Authorized By	 <p>Page 07 of 08 + 01 Dwg.</p>
		
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	

ULR No.: TC536023140000261F


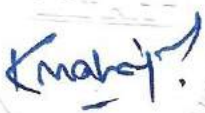

C T O V S 0855

Date : 26 May 2023

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- 12 The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim, or liability arising out of this report.

Format No.: ICAT/VEL/F/52/01

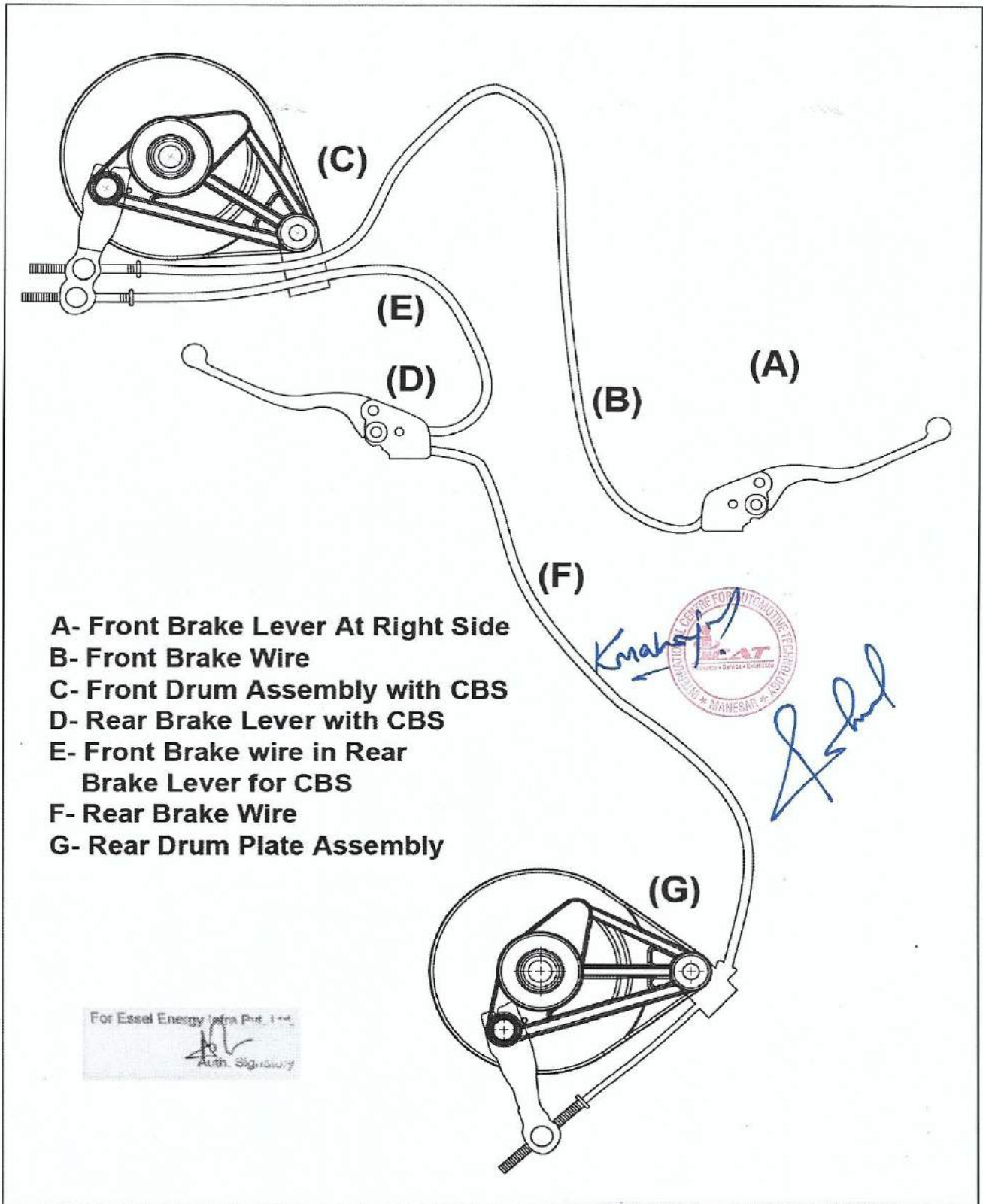
Prepared By	Checked & Authorized By	
		
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	Page 08 of 08 + 01 Dwg.

ULR No.: TC536023140000261F

C T O V S 0855

Date : 26 May 2023

Drawing No. 01



- A- Front Brake Lever At Right Side
- B- Front Brake Wire
- C- Front Drum Assembly with CBS
- D- Rear Brake Lever with CBS
- E- Front Brake wire in Rear
Brake Lever for CBS
- F- Rear Brake Wire
- G- Rear Drum Plate Assembly

For Essel Energy Infra Pvt. Ltd.
 Auth. Signatory

ESSEL ENERGY INFRA PVT. LTD.		Drawing Name - Brake Systems Layout	
Model - SERF	Revision Status: 00	Drawing No.- SERF-04	Date- 15-03-23
		Drawn By- DK Sharma	Approved By- SK Sharma

अंतर्राष्ट्रीय ऑटोमोटिव प्रौद्योगिकी केन्द्र
INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY
 [A Division of NATRiP Implementation Society (NATIS), Govt. of India]

C T O V S 0 8 5 6



Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Objective	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Method	As per AIS-147 : 2018
8	Conclusion	Vehicle meets the compliance requirements of AIS-147 : 2018
9	Place of Issue	ICAT Centre II
10	Total No. of pages	5

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 05 of 05 for Disclaimer.

Prepared By	Checked & Authorized By	Approved By
		
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	Keshav Kr. Tripathi Asst. General Manager



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C T O V S 0856

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**




Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : **ok**

Test Description:- External Projection Requirements for Two Wheeled Motor Vehicles as per AIS-147 : 2018

Rule no.	Clause No.	Parameters	Remarks
123	4) GENERAL REQUIREMENTS		
	4.1.1	Vehicles shall incorporate no pointed, sharp or protruding parts, pointing outwards, of such a shape, dimension, angle of direction and hardness that they increase the risk or seriousness of body lesions and lacerations suffered by any person struck or grazed by the vehicle in the event of an accident. Vehicles shall be designed so that parts and edges with which vulnerable road users such as pedestrians are likely to come into contact in the event of an accident comply with the requirements in points 4. to 5.4.8.	Complies
	4.1.2	All contactable projections or edges which are made of or covered with material such as soft rubber or soft plastic having a hardness of less than 60 Shore (A) are considered to meet the requirements in points 5.4 to 5.4.8. Vehicle manufacturer shall submit component report for hardness testing for which the test shall be carried out with the material fitted to the vehicle as intended. In case test report has not submitted the hardness measurement shall be carried out with the material fitted to the vehicle as intended.	Complies
	5) SPECIFIC REQUIREMENTS		
	5.1.1	In the case of vehicles fitted with a form of structure or panels intended to partially or fully enclose the rider, passenger or luggage or to cover certain vehicle components, the vehicle manufacturer may as an alternative choose to apply the relevant requirements of AIS-120 as prescribed for vehicle category M1, covering either specific external projections or the full external surface of the vehicle. The relevant external projections assessed in conformity with this clause shall be clearly identified in Annex B of this standard and any remaining external surface shall comply with the requirements of this standard.	Not Applicable
	5.2	Motorcycle is provided with a sidecar (Yes/No)	No

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Prepared By	Checked & Authorized By	
		
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C T O V S 0 8 5 6

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**





Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : **ok**

Test Description:- External Projection Requirements for Two Wheeled Motor Vehicles as per AIS-147 : 2018

Rule no.	Clause No.	Parameters	Remarks
123	5.4.1	Radius requirements concerning group 1 parts (contacted by grazing):	
	5.4.1.1	Plates: - Plate edges shall have a radius of curvature of at least 0.5 mm. Structure, fairings, bodywork, etc.: - corners shall have a radius of curvature of at least 3.0 mm. A 'corner' means the three-dimensional shape of a surface which is not a plate edge or a stem.	Complies
	5.4.1.2	Stems - stems or similar parts shall have an overall diameter of at least 10 mm; - the edges on the end of a stem shall have a radius of curvature of at least 2.0 mm.	Complies
	5.4.2	Radius requirements concerning group 2 parts (contacted by collision):	
	5.4.2.1	Plates: - plate edges shall have a radius of curvature of at least 2.0 mm; Structure, fairings, bodywork, etc.: - corners shall have a radius of curvature of at least 2.0 mm.	Not Applicable
	5.4.2.2	Stems - stems or similar parts shall have an overall diameter of at least 20 mm; - however, a stem or a similar part may have an overall diameter of less than 20 mm, provided that its projection is less than half of its overall diameter; - the edges on the end of a stem shall have a radius of curvature of at least 2.0	Not Applicable
	5.4.3	The upper edge of a windscreen or fairing, transparent or not, shall have a radius of curvature of at least 2.0 mm or may be covered with protective material in compliance with point 4.1.2.	Not Applicable
	5.4.3.1	The upper edge is bounded by planes at a 45° angle in relation to the horizontal plane.	Not Applicable
	5.4.3.2	If a radius is applied to the upper edge, it shall not be larger than 0.70 times the thickness of the windscreen or fairing measured at the upper edge, subject to a minimum of 2.0 mm as prescribed in 5.4.3	Not Applicable

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C T O V S 0856

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**



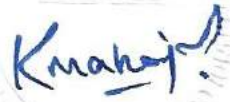
Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Test Description:- External Projection Requirements for Two Wheeled Motor Vehicles as per AIS-147 : 2018

Rule no.	Clause No.	Parameters	Remarks
123	5.4.4	The end of clutch and brake levers mounted on the steering control shall be perceptibly spherical and have a radius of curvature of at least 7.0 mm. The remaining outward edges of these levers shall have a radius of curvature of not less than 2.0 mm along the complete grip application area. The verification is done with the levers in non-applied position.	Complies
	5.4.4.1	If the levers are fully covered by protection shields and can therefore not come into contact with a person struck by the vehicle, the levers are deemed to comply with the requirements of point 5.4.4.	Not Applicable
	5.4.5	The leading edge of the front mudguard or any parts mounted onto it shall have a radius of curvature of at least 2.0 mm	Complies
	5.4.5.1	The leading edge of the front mudguard is bounded by two vertical planes forming a horizontal angle of 45° in relation to the longitudinal median plane of the vehicle.	Complies
	5.4.5.2	If a radius is applied to the leading edge, it shall not be larger than 0.70 times the thickness of the windscreen or fairing measured at the leading edge, subject to a minimum of 2.0 mm as prescribed in 5.4.5.	Not Applicable
	5.4.6	The rear edge of a fuel filler cap or similar shaped device located on the upper surface of the fuel tank, for instance, and likely to be struck by the rider moving forward during a collision, shall not project more than 15 mm from the underlying surface and the transition from the underlying surface shall be smooth or perceptibly spherical. An example is given in Figure 5. It may project more than 15 mm from the underlying surface provided that a protective device is located behind it ensuring that the relative projection of 15 mm is not exceeded.	Not Applicable
	5.4.7	Ignition key heads shall have a protective cap made from rubber or plastic with blunted edges.	Complies
	5.4.8	Outward pointed and protruding parts of the vehicle in its normal and upright position which are not contacted by the testing device, but which could increase the risk or seriousness of body lesions and lacerations as a result of any contact with a person being struck in a collision, shall be blunted.	Complies

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C T O V S 0 8 5 6

Date : 26 May 2023

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<p>Rahul Upadhyay Asst. Manager</p>	<p>Karan Mahajan Dy. Manager</p>	

अंतर्राष्ट्रीय ऑटोमोटिव प्रौद्योगिकी केन्द्र
INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

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

C T O V S 0 8 5 7

Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Objective	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Method	As per AIS-148 : 2018
8	Conclusion	Vehicle meets the compliance requirements of AIS-148 : 2018
9	Place of Issue	ICAT Centre II
10	Total No. of pages	03 + 01 Drawing

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 03 of 03 for Disclaimer.

Prepared By	Checked & Authorized By	Approved By	
			
Rahul Upadhyay	Karan Mahajan	Keshav Kr. Tripathi	
Asst. Manager	Dy. Manager	Asst. General Manager	Page 01 of 03 + 01 Dwg.

C T O V S 0 8 5 7

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**



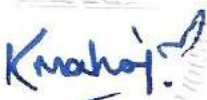
Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Test Description:- Requirements of Footrests for Two-Wheeled Vehicles as per AIS-148:2018

Rule No.	Clause No.	Parameters	Remarks
123	1.3	All seating positions of the vehicle shall be fitted either with designated footrests or a floor or floor boards on which both of the rider's or pillion's feet can rest.	Complies
	1.3.1.1	The vehicle's floor, each designated floor board as illustrated in fig 3 of Annex B and each designated footrest as illustrated in fig 2 and 3 of Annex B shall be capable of withstanding, without resulting any permanent deformation which is harmful to its function, a vertical compression force of 1700 N (170 kg), applied statically to any point on the floor or floor board or 15 mm from the end of the footrest at a maximum pressure of 2.0 MPa.	Complies
	1.3.1.2	In cases where an additional side saddle footrest as illustrated in fig. 1, 2 and 3 of Annex B is provided for Pillion rider, it shall be capable of withstanding, without resulting any permanent deformation which is harmful to its function, a vertical compression force of 1000 N (100 kg), applied static load on the total surface area of the footrest, at a maximum	Not Applicable
	1.3.1.3	The space provided by each designated footrest including the space on the floor or floor board, shall be sufficient for a foot at least 300 mm long and at least 110 mm wide to be placed safely without hampering the vehicle operator's feet. Footrests shall be located so that no direct contact between the foot/leg and rotating parts (e.g. tyres) of the vehicle is possible when in use.	Complies

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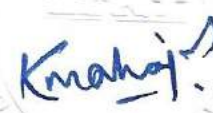

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Date : 26 May 2023

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- 12 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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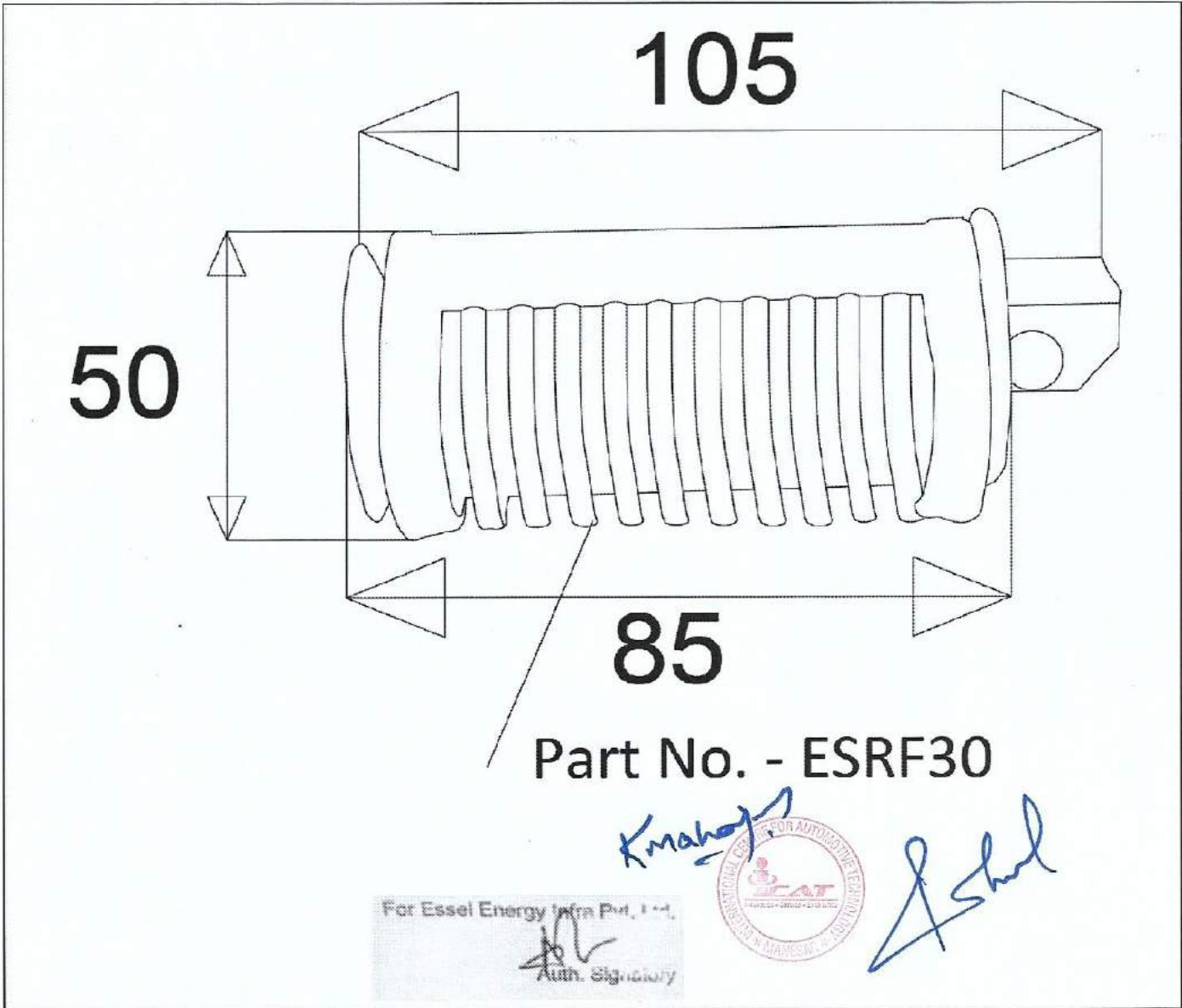
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		 <p>Page 03 of 03 + 01 Dwg.</p>
<p>Rahul Upadhyay</p>	<p>Karan Mahajan</p>	
<p>Asst. Manager</p>	<p>Dy. Manager</p>	

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Date : 26 May 2023

Drawing No. 01



Part No. - ESRF30

K Mahajan
SK Sharma

For Essel Energy Infra Pvt. Ltd.
[Signature]
Auth. Signatory



ESSEL ENERGY INFRA PVT. LTD.		Drawing Name - Pillion Foot Rest	
Model - SERF		Drawing No.- SERF-11	Date- 15-03-23
Revision Status: 00		Drawn By- DK Sharma	Approved By- SK Sharma

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C T O V S 0 8 5 8

Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Objective	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Method	As per AIS-009 (Rev.1): 2011
8	Conclusion	Vehicle meets the compliance requirements of AIS-009 (Rev.1): 2011.
9	Place of Issue	ICAT Centre II
10	Total No. of pages	13 + 01 Drawing

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 13 of 13 for Disclaimer.

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			Page 01 of 13 + 01 Dwg.

C T O V S 0858

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**




Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Parameters					Remarks
124 (1) (24)	Fitment of lamps (Clause No. 4.1.1 and Table1)					
	Lamp	Mandatory/ Not mandatory	Provided/ Not Provided	Number	Colour	Observed Marking(s)
	Main Beam Head Lamp	Optional	Provided	Two	White	KK KR-9371
	Dipped Beam Head Lamp	Mandatory	Provided	Two	White	
	Front position lamp	Optional	Provided	Two	White	
	Front Direction Indicator Lamp	Mandatory	Provided	Two	Amber	KK KR-9390
	Rear Direction Indicator Lamp	Mandatory	Provided	Two	Amber	KK AN 4369 KR-9373
	Rear Position Lamp	Mandatory	Provided	One	Red	
	Stop Lamp	Mandatory	Provided	One	Red	
	Rear Registration Plate Lamp	Mandatory	Provided	One	White	KK KR-9179
	Rear Retro Reflector	Mandatory	Provided	One	Red	HILUX K-LITE, KM-202
	Side Retro Reflector (Rear)	Mandatory	Provided	One per side	Amber	HILUX, KM-101

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Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**



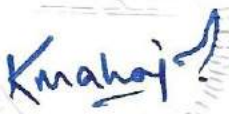
Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : **ok**

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	5) GENERAL SPECIFICATIONS		
	5.1	The lighting and light-signalling devices shall be so fitted that in normal conditions of use, and not withstanding the vibrations to which they may be subjected, they retain the characteristics prescribed by this standard and enable the vehicle to comply with the requirements of this standard. In particular, it shall not be possible for the lamps to be inadvertently maladjusted.	Complies
	5.2	The illuminating lamps shall be so installed that, correct adjustment of their orientation can easily be carried out.	Complies
	5.3	For all light-signalling devices the reference axis of the lamp when fitted to the vehicle shall be parallel to the bearing plane of the vehicle on the road; in addition, it shall be perpendicular to the median longitudinal plane of the vehicle in the case of side retro-reflectors and parallel to that plane in the case of all light-signalling devices. A tolerance of + 3° shall be allowed in each direction. In addition, if specifications for fitting are provided by the manufacturer they shall be complied with.	Complies
	5.8	In the absence of specific instructions, no lamps other than direction-indicator lamps and the vehicle-hazard warning signal shall be flashing lamps.	Complies
	5.9	No red light shall be visible towards the front and no white light shall be visible towards the rear.	Complies
	5.10	The electrical connections shall be such that the front position lamp or the passing beam headlamp, if there is no front position lamp, the rear position lamp and the rear-registration-plate illuminating device cannot be switched on or off otherwise than simultaneously unless otherwise specified. However the above condition is not applicable during the time period between master control switch (Ignition Switch) on and the starting of the engine.	Complies
	5.11	In the absence of specific instructions, the electrical connection shall be such that the driving beam headlamp, the passing beam headlamp and the fog lamp cannot be switched on unless the lamps referred to in 5.10. above are likewise switched on.	Complies

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**PERFORMANCE TEST (CMVR) REPORT
SERF**


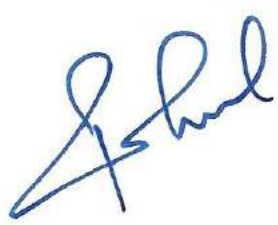

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.1	Driving beam headlamp	
	6.1.3	Position	
	6.1.3.1	Width	
	6.1.3.1.1	An independent driving lamp may be fitted above or below or to one side of another front lamp: if these lamps are on top of the other the reference centre of the driving lamp shall be located within the median longitudinal plane of the vehicle; if these lamps are side by side their reference centre shall be symmetrical in relation to the median longitudinal plane of the vehicle.	Driving beam headlamp is grouped with Front Position lamp and Passing Beam headlamp.
	6.1.3.1.2	A driving beam headlamp, that is reciprocally incorporated with another front lamp, shall be fitted in such a way that its reference centre lies within the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with an independent passing beam headlamp, or a passing beam headlamp that is reciprocally incorporated with a front position lamp alongside the driving beam headlamp, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle.	
	6.1.3.1.3.	two driving lamps of which either one or both are reciprocally incorporated with another front lamp shall be fitted in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.	
	6.1.3.2.	The length: at the front of the vehicle. This requirement is regarded as satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly by means of the rear-view mirrors and/or reflective surfaces on the vehicle.	Complies
	6.1.3.3.	In any case, the distance between the edge of the illumination surface of any independent driving lamp and the edge of that of the passing lamp shall not exceed 200 mm.	Not Applicable
	6.1.3.4.	In the case of two driving lamps:	
	6.1.3.4.1	In the case of L1 and L2 category vehicles, the distance separating the illuminating surfaces of two driving lamps shall not exceed 200 mm.	Complies
6.1.4.	Geometric visibility:- The visibility of the illuminating surface, including its visibility in areas which do not appear to be illuminated in the direction of observation considered, shall be ensured within a divergent space defined by generating lines based on the perimeter of the illuminating surface and forming an angle of not less than 5° with the axis of reference of the headlamp.	Complies	

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Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	

C T O V S 0858

Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT
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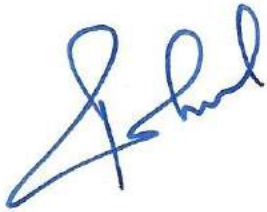

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.1.5.	Orientation:- Forwards. The lamp(s) may move with the steering angle.	Complies
	6.1.6.	May not be "combined" with any other lamp.	Complies
	6.1.7.	Electrical connections The driving beam headlamps shall switch on simultaneously. When switching from the passing to the driving beam all of the driving-beam headlamps shall be lit. When switching from the driving beam to the passing beams all of the driving-beam headlamps shall be switched off simultaneously. The passing beam(s) may remain illuminated with the driving beam(s).	Complies
	6.1.8.	"Circuit-closed" tell-tale" Mandatory. <u>Non flashing Blue</u> signal lamp.	Provided & Complies
	6.2	PASSING BEAM HEADLAMP	
	6.2.3.	Position	
	6.2.3.1.	Width	
	6.2.3.1.1.	An independent passing lamp may be installed above, below or to one side of another front lamp: if these lamps are one above the other the reference centre of the passing lamp shall be located within the median longitudinal plane of the vehicle; if these lamps are side by side their reference centre shall be symmetrical in relation to the median longitudinal plane of the vehicle.	Passing beam headlamp is grouped with Front Position lamp and Driving Beam headlamp.
	6.2.3.1.2.	A passing beam headlamp, that is reciprocally incorporated with another front lamp, shall be fitted in such a way that its reference centre lies within the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with an independent driving beam headlamp, or a driving beam headlamp that is reciprocally incorporated with a front position lamp alongside the passing beam headlamp, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle.	
	6.2.3.1.3.	Two passing lamps, of which either one or both are reciprocally incorporated with another front lamp shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.	
6.2.3.3.	Length: at the front of the vehicle. This requirement is regarded as satisfied if the light emitted does not cause discomfort to the driver either directly or indirectly by means of the rear-view mirrors and/or reflective surfaces of the vehicle.	Complies	

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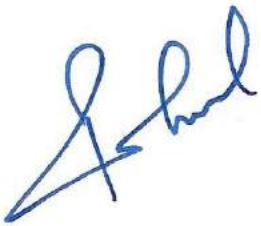

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.2.3.4.	In the case of two passing lamps:	
	6.2.3.4.1	In the case of L1 and L2 category vehicles, the distance separating the illuminating surfaces of two passing lamps shall not exceed 200 mm.	Complies
	6.2.4.	Geometric visibility:- $\alpha = 15^\circ$ upwards and 10° downwards; $\beta = 45^\circ$ to the left and to the right for a single lamp; $\beta = 45^\circ$ outwards and 10° inwards for each pair of lamps. The presence of partitions or other items of equipment near the head-lamp shall not give rise to secondary effects causing discomfort to other road users.	Complies
	6.2.5.	Orientation	
	6.2.5.1.	Forwards. The lamp(s) may move in line with the steering angle.	Complies
	6.2.6.	May not be "combined" with any other lamp.	Complies
	6.2.7.	Electrical connections The passing -beam headlamps shall switch on simultaneously. The control for changing over to the passing beam(s) shall switch off the driving beam(s)	Complies
	6.2.8.	Tell-tale Optional; non-flashing green signal lamp.	Not Provided
	6.3	Direction indicator lamp	
	6.3.3.	Position	
	6.3.3.1.	in width:	
	6.3.3.1.1.	For front indicators, the following requirements shall all be met: (a) Dimension: (i) In the case of L1 and L2 categories, there shall be a minimum distance of 240 mm between illuminating surfaces.	245 mm
		(b) the indicators shall be situated outside the longitudinal vertical plane tangential to the outer edges of the illuminating surface of the headlamp(s).	Complies
	6.3.3.1.2.	For rear indicators (i) In the case of L1 and L2 category vehicles, the clearance between the inner edges of the two illuminating surfaces shall be at least 180 mm on the condition that the prescriptions of 2.11. are applied even when the registration plate is mounted.	182 mm

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Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.3.3.3.	in length: the forward distance between the centre reference of the rear indicators and the transverse plane which constitutes the rearmost limit of the vehicle's over-all length shall not exceed 300 mm.	210 mm
	6.3.4.	Geometric visibility:- Horizontal angles: 20° inwards and 80° outwards for L1 and L2 category Vertical angles: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamps is less than 750 mm.	Complies
	6.3.5.	Orientation The front direction-indicators may move in line with the steering angle.	Complies
	6.3.6.	Shall not be "combined" with any other lamp.	Complies
	6.3.7.	Shall not be "reciprocally incorporated" with any other lamp.	Complies
	6.3.8.	Electrical connections	
	6.3.8.1	Direction-indicator lamps shall switch on independently of the other lamps. All direction indicator lamps on one side of a vehicle shall be switched on and off by means of one control.	Complies
	6.3.8.2	If the front direction indicator lamp and amber coloured front position lamp are grouped and condition of 7.7.4. of AIS-010 (Part 3)(Rev. 1) are not met, the electrical connections shall be such that the front position shall be switched off during the entire period (both ON and OFF cycle) of activation of the direction indicator lamp.	Not Applicable
	6.3.9	"Circuit-closed" tell-tale:- Mandatory. Shall be optical. It shall be (a) flashing green lamp(s), which, in the event of defective operation of any of the direction-indicators, is extinguished; remains alight without flashing, or show a marked change of frequency. An additional auditory circuit closed tell-tale may also be fitted.	Complies
	6.3.10.	Other requirements:- The light flashing frequency shall be 90 ± 30 times per minute and the flashing of the direction-indicators on the same side of the vehicle may occur synchronously or alternately.	72 flashes/min
6.4. Stop lamp			
6.4.3. Position			
6.4.3.1.	Width : If there is only one stop lamp its centre of reference shall lie within the median longitudinal plane of the vehicle, or if there are two stop lamps they shall be symmetrical to the median longitudinal plane of the vehicle.		Complies

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Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.4.4.	Geometric visibility:- Horizontal angle: 45° to left and to right for a single lamp; 45° outwards and 10° for L1 and L2 category vehicles inwards for each pair of lamps; Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.	Complies
	6.4.5.	Orientation:- Towards the rear of the vehicle.	Complies
	6.4.6.	Electrical connections:- Shall light up at any service brake application The stop lamps need not function if the device which starts and/or stops the engine is in a position which makes it impossible for the engine to operate.	Complies
	6.4.7.	"Circuit-closed" tell-tale:- Tell-tale optional; where fitted, this tell-tale shall be a tell-tale consisting of a non-flashing warning light which comes on the event of the malfunctioning of the stop lamps."	Not Provided
	6.5.	Rear-registration-plate illuminating device	
	6.5.2. to 6.5.5.	Such that the device illuminates the space reserved for the rear registration plate.	Complies
	6.5.6.	Tell-tale Optional: Its function shall be performed by the tell-tale prescribed for the position	Not Provided
	6.6.	Front position lamp	
	6.6.3.	Position	
	6.6.3.1.	Width: an independent front position lamp may be fitted above or below, or to one side of another front lamp: if these lamps are one above the other, the reference centre of the front position lamp shall be located within the median longitudinal plane of the vehicle; if these lamps are side by side, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle;	Front Position lamp is grouped with Driving and Passing Beam headlamp.
		a front position lamp, that is reciprocally incorporated with another front lamp, shall be installed in such a way that its reference centre is situated in the median longitudinal plane of the vehicle. However, when the vehicle is also fitted with another front lamp alongside the front position lamp, their reference centres shall be symmetrical in relation to the median longitudinal plane of the vehicle.	
		Two front position lamps, one or both of them reciprocally incorporated with another front lamp, shall be installed in such a way that their reference centres are symmetrical in relation to the median longitudinal plane of the vehicle.	

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Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
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Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.6.3.3.	in length: at the front of the vehicle.	Complies
	6.6.4.	Geometric visibility:- Horizontal angle: 80° to left and to right for a single lamp: the horizontal angle may be 80° outwards and 45° inwards for each pair of lamps. Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm	Complies
	6.6.5.	Orientation Forwards. The lamp(s) may move in line with the steering angle.	Complies
	6.6.6.	"Circuit-closed" tell-tale Mandatory. Non-flashing green signal lamp. This tell-tale shall not be required if the instrument illumination lighting can be switched on or off only simultaneously with the position lamp(s).	Complies
	6.7.	Rear position lamp	
	6.7.3.	Position	
	6.7.3.1.	Width	
	6.7.3.1.1.	The reference centre shall be located on longitudinal median plane of the vehicle if there is only one rear position lamp or, if there are two rear position lamps, these shall be symmetrical to longitudinal median plane of the vehicle.	Complies
	6.7.4.	Geometric visibility:- Horizontal angle: 80° to left and to right for a single lamp: the horizontal angle may be 80° outwards and 45° inwards for each pair of lamps. Vertical angle: 15° above and below the horizontal. The vertical angle below the horizontal may be reduced to 5°, however, if the height of the lamp is less than 750 mm.	Complies
	6.7.5.	Orientation:- Rearwards.	Complies
	6.7.6.	"Circuit-closed" tell-tale:- Optional: Its function shall be performed by the device prescribed for the front position lamp.	Complies
	6.8	Rear retro-reflector, non-triangular	
6.8.4.	Geometric visibility:- Horizontal angle: 30° to left and to right for a single reflector; 30° outwards and 10° inwards for each pair of reflectors; Vertical angle: 15° above and below the horizontal.	Complies	

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Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
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Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks
124 (1) (24)	6.8.5.	Orientation Rearwards.	Complies
	6.8.6.	Position- Width	
	6.8.6.1.	The reference centre shall be located on longitudinal median plane of the vehicle if there is only one retro-reflector. If there are two retro-reflectors, these shall be symmetrical to longitudinal median plane of the vehicle.	Complies
	6.9	Vehicle-Hazard Warning signal (Optional)	
	6.9.1	Optional:- The signal shall be given by simultaneous operation of the Direction-indicator lamps in accordance with the requirements of Cl. No 6.3 of AIS 009 (rev-1):2011	Not Provided
	6.9.2	Electrical connections The signal shall be given by means of a separate control enabling all the direction-indicators to be supplied with current simultaneously.	Not Provided
	6.9.3	"Circuit-closed" tell-tale:- Mandatory. Flashing red signal lamp or, in the case of separate tell-tales, the simultaneous operation of the tell-tale prescribed in 6.3.9 of AIS -009 (REV-01):2011	Not Provided
	6.9.4.	Other requirements:- Light flashing 90 ± 30 times per minute. Operation of the lamp-signal control shall be followed within not more than one second by the appearance of the light and within not more than one-and-one-half seconds by the first extinction of the light.	Not Provided
	6.12.	Side retro-reflector, non-triangular	
	6.12.3.	Position	
	6.12.3.1.	on the side of the vehicle.	Complies
	6.12.3.3.	in length: should be placed in such a position that under normal conditions it may not be masked by the driver's or passenger's clothes.	Complies
	6.12.4.	Geometric visibility:- Horizontal angles $\beta = 30^\circ$ to the front and to the rear. Vertical angles $\alpha = 15^\circ$ above and below the horizontal. The vertical angle below the horizontal may be reduced to 5° , however, if the height of the retro-reflector is less than 750 mm.	Complies
	6.12.5.	Orientation:- The reference axis of the retro-reflectors shall be perpendicular to the vehicle's median longitudinal plane and directed outwards. The front side retro-reflectors may move with the steering angle.	Complies

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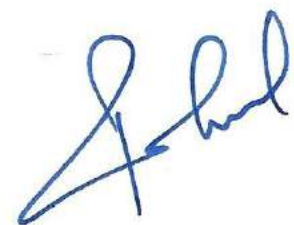

Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks			
124 (1) (24)	Location - Height of the Lamps					
	Lamp	Minimum Height (mm)		Maximum Height (mm)		
		Required	Measured	Required	Measured	
		Driving beam Head lamp	500	775	1300	820
		Passing beam Head lamp	500	700	1200	770
		Front Position Lamp	350	690	1200	775
		Front Direction indicator	350	1022	1200	1059
		Rear Position Lamp	250	680	1500	800
		Stop Lamp	250	680	1500	800
		Rear Retro Reflector	250	440	900	470
		Rear Direction indicator	350	720	1200	770
		Side Reflex Reflector (Front)	Not Provided			
	Side Reflex Reflector (Rear)	300	510	900	565	

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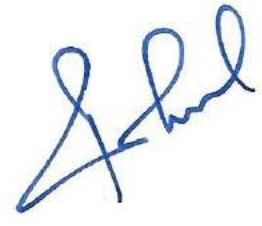

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Physical/Functional verification of sample : ok

Lighting and Light – Signaling Devices as per AIS-009 (Rev.1): 2011

Rule No.	Clause No.	Parameters	Remarks		
Grouping, Combining and Reciprocal Incorporation of Lamp					
124 (1) (24)	12.0,13.0 & 14.0 (Table No. 4, 5 and 6)	Lamp	Grouping	Combining	Incorporated with
		Driving Beam head lamp	Passing Beam Head Lamp & Front Position Lamp	--	--
		Passing Beam Head Lamp	Driving Beam Head Lamp & Front Position Lamp	--	--
		Front Direction Indicator Lamp	Independent		
		Rear Position Lamp	Rear Direction Indicator Lamp	--	Stop Lamp
		Rear Registration Plate Illuminating Lamp	Independent		
		Rear Direction Indicator Lamp	Rear Position/Stop Lamp	--	--
		Front Position Lamp	Driving Beam & Passing Beam Head Lamp	--	--
		Rear Retro Reflector	Independent		
		Stop Lamp	Rear Direction Indicator Lamp	--	Rear Position Lamp
		Side Retro Reflector (Rear)	Independent		
		Reversing Lamp	Not Provided		

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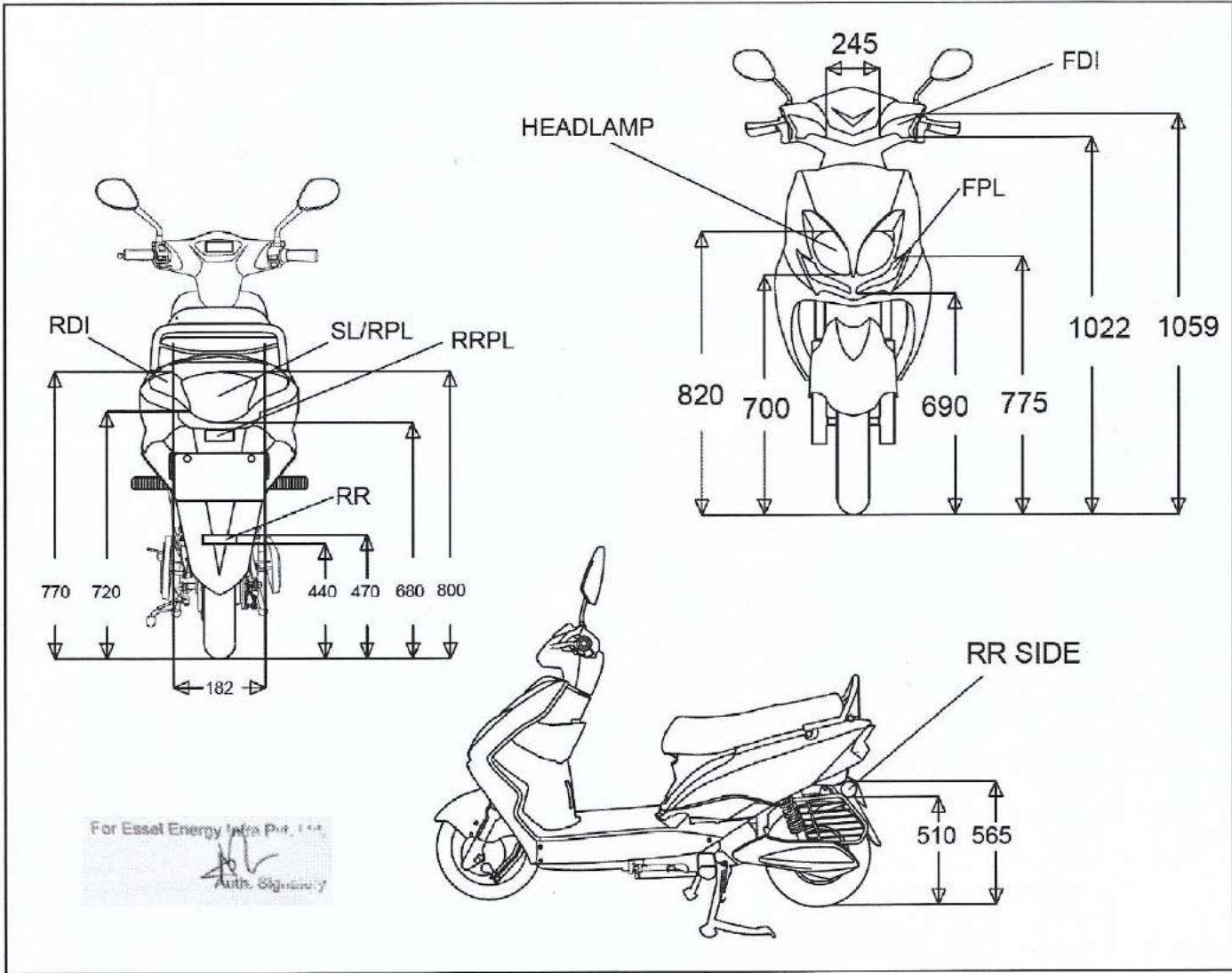
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For Essel Energy Infra Pvt. Ltd.
 [Signature]
 Auth. Signature

ESSEL ENERGY INFRA PVT. LTD.		Drawing Name - Lighting Installation	
Model - SERF		Drawing No. - SERF-05	Date - 15-03-23
Revision Status: 00		Drawn By - DK Sharma	Approved By - SK Sharma

[Signature] [Signature]

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INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY

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

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Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Objective	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Method	As per AIS-146 : 2018
8	Conclusion	Vehicle meets the compliance requirements of clauses of AIS 146 : 2018 mentioned in this report
9	Place of Issue	ICAT Centre II
10	Total No. of pages	6

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 06 of 06 for Disclaimer.

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Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
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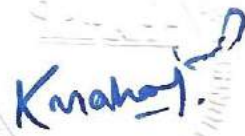
Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Test Description :- Requirements applying to Stands fitted in Two Wheeled Motor Vehicles as per AIS-146 : 2018

Rule No.	Clause No.	Parameters	Remarks
123	5.1) GENERAL REQUIREMENTS		
	5.1.1	Vehicles of categories L1 and L2 shall be fitted with at least one stand.	Complies
	5.1.1.1	Each stand fitted to the vehicle shall enable the vehicle to meet the performance requirements in 5.2 to 5.2.5.2 without being held or supported by a person or any other external means.	Complies
	5.1.1.2	Vehicles fitted with twinned wheels may not need to be fitted with a stand provided that the performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4 are met.	Not Applicable
	5.1.1.3	Prop stands fitted to vehicles of category L1 with a mass in running order of less than 35 kg are exempted from the requirements in 5.2.3.3, to 5.2.3.4 and 5.2.5.2.	Not Applicable
	5.1.2	Vehicles of category L2 fitted with side car shall be fitted with at least one stand under the following conditions:	Not Applicable
	5.1.2.1	If the side-car is detachable from the motorcycle so that the motorcycle be used without it, the motorcycle shall fulfill the requirements for solo motorcycles in 5.1.1. to 5.1.1.2.	
	5.2) SPECIFIC REQUIREMENTS		
	5.2.1	A stand shall be either a prop stand or centre stand.	Both stands are provided
	5.2.2	Where the stand swivels below or about the lower part of the vehicle, its free end shall swing to the rear of the vehicle to reach the not-in-use position.	Complies
	5.2.3) SPECIFIC REQUIREMENTS FOR PROP STANDS		
	5.2.3.1	A prop stand shall be able to support the vehicle in such a way as to provide its lateral stability whether the vehicle is on a horizontal supporting surface or on a slope. It shall also prevent the stationary vehicle leaning more deeply or being moved too easily into an upright position to such an extent that it becomes unstable and may fall or tip over. Note: this condition is deemed to be satisfied if the requirement specified in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4 are complied with.	Complies
5.2.3.2	A prop stand shall be able to support the vehicle in such a way as to maintain full stability when the vehicle is parked on a slope. This requirement is checked in accordance with the procedures and performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4.	Complies	

Format No.: ICAT/VEL/F/121/00

Prepared By	Checked & Authorized By	 <p>Page 02 of 06</p>
		
Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	

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C T O V S 0 8 5 9

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**



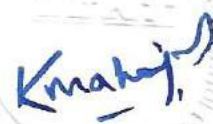
Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : **ok**

Test Description :- Requirements applying to Stands fitted in Two Wheeled Motor Vehicles as per AIS-146 : 2018

Rule No.	Clause No.	Parameters	Remarks	
123	5.2.3.3	A prop stand shall be able to swing back Automatically into the not-in-use position under the following conditions: - When the vehicle is returned to its normal upright riding position, or - When the vehicle starts to move forward as a result of deliberate action by the rider, while in its normal upright riding position.	Not Applicable	
	5.2.3.4	The requirements in point 5.2.3.3 are not applicable if the vehicle is designed in such a way that - it cannot be propelled when the prop stand is in the in-use position; Note: This can be achieved by any suitable method as per the choice of manufacturer and deemed to be compliant on satisfactory demonstration to the test agency.	Complies	
	5.2.3.5	A prop stand shall be so designed and constructed that it does not swing back automatically if the vehicle is being leaned down in order to bring the free end of the prop stand into contact with the ground surface.	Complies	
	5.2.3.6	A prop stand shall be so designed and constructed that it does not swing back automatically if the angle of lean is altered unexpectedly or unintentionally (e.g. if the vehicle is pushed lightly by a third party or if the vehicle is subjected to a gust of wind arising from the passage of a large vehicle) under the following conditions: - when the vehicle is left unattended in its parked position, and - when the prop stand is in the in-use position.	Complies	
	5.2.4) SPECIFIC REQUIREMENTS FOR CENTRE STANDS			
	5.2.4.1	A centre stand shall be able to support the vehicle, whether or not one or both wheels are in contact with the ground surface, so as to provide its lateral stability when the vehicle is on a horizontal supporting surface or on a slope.	Complies	
5.2.4.2	A centre stand shall be able to support the vehicle so as to maintain full stability when the vehicle is parked on a slope. This requirement is checked in accordance with the procedures and performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4.	Complies		

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Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable




Physical/Functional verification of sample : **ok**

Test Description :- Requirements applying to Stands fitted in Two Wheeled Motor Vehicles as per AIS-146 : 2018

Rule No.	Clause No.	Parameters	Remarks						
123	5.2.4.3	A centre stand shall be able to swing back automatically into the not-in-use position when the vehicle is moved forward purposely so as to raise the centre stand from the ground surface.	Complies						
	5.2.4.4	The requirement in 5.2.4.3 is not applicable if the vehicle is so designed that it cannot be propelled when the centre stand is in the in-use position.	Not Applicable						
	5.3.4.3) TILT REQUIREMENTS FOR PROP AND CENTRE STANDS								
	5.3.4.3	Transverse Tilt (to the left)	Tilt		Prop		Centre		
			L1	5%	L1	6%	Complies		
		L2	6%	L2	8%	Not Applicable			
		Transverse Tilt (to the right)	L1	5%	L1	6%	Complies		
			L2	6%	L2	8%	Not Applicable		
		Longitudinal Tilt (downstream)	L1	5%	L1	6%	Complies		
			L2	6%	L2	8%	Not Applicable		
		Longitudinal Tilt (upstream)	L1	6%	L1	12%	Complies		
			L2	8%	L2	14%	Not Applicable		

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Date : 26 May 2023

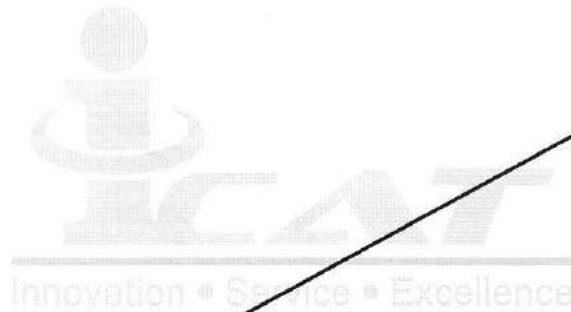
PERFORMANCE TEST (CMVR) REPORT
SERF

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Rule No.	PARAMETER	TEST RESULTS	
--	Weight Measurement		
	Unladen	Specified	Measured
	FAW , kg	38.0	38.0
	RAW , kg	60.0	60.0
	Total weight , kg	98.0	98.0

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Rahul Upadhyay
Asst. Manager

Karan Mahajan
Dy. Manager




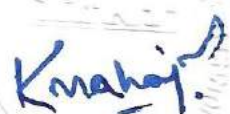

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- 2 ICAT issues Test Reports/ Extension Reports/ Developmental Test Reports in compliance to Motor Vehicle Act/ Central Motor Vehicle Rules and their provisions as amended from time to time or any other statutory orders under which ICAT is authorized. Other Rules/Acts are outside the purview/scope of the Test Reports/ Extension Reports/ Developmental Test Reports.
- 3 Test(s) on prototype /vehicle(s) or 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 ordered by Government, Court, etc.
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- 5 Where applicable, ICAT provides statement of conformity based on ISO/IEC Guide 98-4 in reports issued.
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- 10 Further, ICAT has the right, but not under obligation to initiate cancellation / withdrawal of the Test Reports/ Extension Reports/ Developmental Test Reports is/are issued in case of any fraud, misrepresentation, when it surfaces and comes in the knowledge of ICAT.
- 11 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.
- 12 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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<p>Rahul Upadhyay Asst. Manager</p>	<p>Karan Mahajan Dy. Manager</p>	

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INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY
[A Division of NATRiP Implementation Society (NATIS), Govt. of India]

C T O V S 0860






Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Objective	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Method	As per respective standards.
8	Conclusion	Vehicle meets the compliance requirements of respective standards
9	Place of Issue	ICAT Centre II
10	Total No. of pages	09 + 03 Drawings

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 09 of 09 for Disclaimer.

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			Page 01 of 09 + 03 Dwgs.

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Date : 26 May 2023



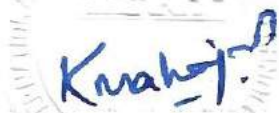
**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.	PARAMETER	Test Results & Remarks		
		Measured, mm	Limit, mm	
93	Overall Dimensions	Overall width	680	1000
		Overall length	1870	4000
		Overall height	1180	2500
94	Condition of tyres	Shall be fitted with pneumatic tyres in a properly inflated and good condition	Complies	
95	Size and Ply Rating of Tyres	Tyres fitted on the vehicle shall be in accordance with AIS-050:2004	Front - JK TYRE 90/90-12 54J	Complies
			Rear - JK TYRE 90/90-12 54J	
102	Signalling Devices, direction indicators and stop lights	Signals to turn shall be given by electrically operated direction indicators	Complies	
		Shall be of amber colour and a flashing rate of 60 to 120 flashes/min	72 flashes/min	
		Flashing shall be clearly visible from front and rear	Complies	
		One stop lamp of red colour shall be provided at the rear which shall light-up on actuation of brake on any wheel	Complies	
103	Position of the indicator	Shall be so fitted that the driver shall be aware for its corrected functioning. Tell tale shall be used	Complies	
104	Fitment of reflectors	One red reflector at the rear having area greater than or equal to 7 cm ²	Complies	
105	Lamps	Shall be provided with one head lamp throwing white light at front, visible from a distance of 155 m	Complies	
		Shall be provided with one rear lamp of red colour, visible from a distance of 75 m	Complies	
		Shall be provided with one number plate lamp at rear of white light, number plate visible from a distance of 15m	Complies	

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Date : 26 May 2023




**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.	PARAMETER	Test Results & Remarks
108	Use of red, white or blue light	Vehicle shall not throw a red light to the front or light other than red to the rear Complies
111	Prohibition of spot lights, etc.	No spot light or search light shall be carried on the front of the vehicle Complies
114	Exhaust gases and exhaust pipes	Provision shall be made for exhaust gases to escape to the right side or to the rear of the vehicle, sight downward angle to be provided. Exhaust pipes shall be located at a distance of 35 mm from fuel line Not Applicable (Battery Operated Vehicle)
117	Speedometer	Every motor vehicle shall be provided with an instrument so constructed and fixed in such a position as to indicate to the driver of the vehicle the speed at which the vehicle is travelling Complies
119	Horns	Vehicle shall be fitted with an electric horn. Multi tone horn are not permitted. Complies
120	Silencer	Vehicle shall be fitted with a device which by means of an expansion chamber or otherwise reduces as far as practicable, the noise that would otherwise be made by the escape of exhaust gases from the engine Not Applicable (Battery Operated Vehicle)
121	Painting of motor vehicles	Vehicle shall not be painted in olive green colour except those belonging to defence department Complies

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Date : 26 May 2023

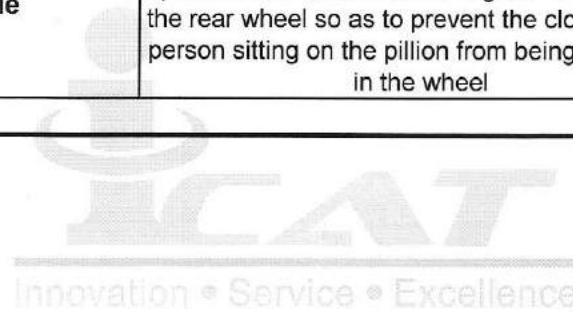
**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.	PARAMETER	Test Results & Remarks	
122	Embossment of the chassis number and engine number or in the case of battery operated vehicles, motor number and month of manufacture	Vehicle shall bear the identification number including month and year of manufacture, embossed or etched or punched on it, in accordance with AIS-065:2005	Complies
123	Safety devices in motor vehicle	The vehicle shall not be constructed without provision for a permanent hand grip on the side or behind the driver's seat and a foot rest and a protective device not covering less than half of the rear wheel so as to prevent the clothes of the person sitting on the pillion from being entangled in the wheel	Complies

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Rahul Upadhyay
Asst. Manager

Karan Mahajan
Dy. Manager

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+
03 Dwgs.

C T O V S 0 8 6 0

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok




Test Description:- RVM Installations as per AIS : 002 (Part 2) (Rev.1) : 2011

Rule No.	Clause No.	Parameters	Remarks
125(2)	16.1.1	The rear-view mirrors installed on the vehicle shall be of "Class L" as per AIS-001 (Part 2) (Rev. 1) : 2011.	Complies
	16.1.2	Rear-view mirrors shall be fixed in such a way that they remain steady under normal conditions of use.	Complies
	16.2.2	All the L category vehicles without body work partly or wholly encloses the driver, with a maximum design speed exceeding 50 km/h shall be fitted with two rear-view mirrors, one on the left and one on the right of the vehicle.	Complies
	16.3.1	Rear-view mirrors shall be mounted or adjusted in such a way that the distance of the centre of the reflective surface, as measured in a horizontal plane, is at least 280 mm outward from the longitudinal vertical plane passing through the centre of the steering head of the vehicle. Before the measurement, the handlebar shall be placed in the straight ahead position and the mirror(s) shall be adjusted to its (their) normal position.	Complies
	16.4.1	Rear-view mirror(s) shall be such that the driver is able to adjust it (them) in the normal driving position.	Complies

Rear View Mirror assembly, Details -

Make	:	M/s HILUX
Observed Identification	:	HL-5005
Drawing Number	:	Refer Drawing no. 01 of this report.

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Date : 26 May 2023




**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	26 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : **ok**

Rule No.	PARAMETER	TEST RESULTS	
119 (1)	Horn Installation as per IS 15796:2008	Maximum Sound Pressure Level, dB(A)	
		Measured	Limit
		91.0 dB(A) @ 13.1 V	Between 83 to 112 @ 13 ± 0.5V
Motor, Max power(kW) - 2.6 Horn, Make - M/s Rajulex Type - 2A Id observed - RK-2342 JBI-116 Drawing No. - Refer Drawing no. 02 of this report. Test conducted for introduction of new model. Case of New Type Approval.			
Format No.: ICAT/VEL/F/63/00			



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Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of Sample : ok

Rule No.		TEST RESULTS
105(1)(bb)	Automatic Headlamp ON (AHO) (GSR 188(E) Dt.- 22/02/2016) Every two wheeler manufactured on and after the 1st April, 2017, shall have one or two head lamps, conforming to the applicable standards in force for performance and installation requirements as notified by the Central Government from time to time vide according to sub-rule (1) of rule 124, which shall automatically switch on when the engine is running.	Complies
	Provided that, the above condition of the head lamp being lit when the engine is running is deemed to be satisfied if daytime running lamp(DRL) is provided, conforming to the applicable standards in force for performance and installation requirements as notified by the Central Government from time to time, which shall be lit automatically if the engine is running.	Not Applicable
	Provided further that the daytime running lamp(DRL) shall be lit off automatically if the engine is running and the head lamp is switched on.	Not Applicable

Photographs





MOTOR OFF CONDITION



MOTOR ON CONDITION



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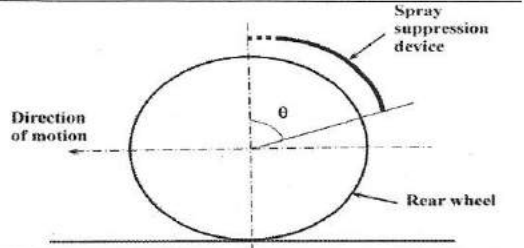
Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**




Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	25 May 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Test Description : Spray Suppression system as per AIS 103 : 2009

Rule No.	Clause No.	Parameters	Remarks
GENERAL REQUIREMENTS			
124 (1) (48)	5.1	If wheel coverage angle (i.e., θ) is up to 45° , then the width of spray-suppression system (W) \geq "Tyre Overall width" of the rear tyre (W_o).	Complies (Refer Drawing no. 03 of this report)
		If wheel coverage angle (i.e., θ) is at 60° , then the spray-suppression system width (W) \geq half of tyre overall width (W_o).	Complies (Refer Drawing no. 03 of this report)
SPECIFIC REQUIREMENTS			
	6.1	The spray-suppression system provided for the rear wheel shall extend not less than wheel coverage angle (θ) when the vehicle shall be in kerb weight condition added with a weight of 68 kg and tyres shall be inflated as recommended by the vehicle manufacturer for the specified load condition.	Complies (Refer Drawing no. 03 of this report)
	6.1.1	The rear wheel coverage angle θ shall be at least 60° as per the below figure: 	Complies (Refer Drawing no. 03 of this report)

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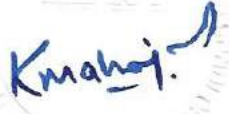


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- 12 The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.

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Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	Page 09 of 09 + 03 Dwgs.

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Date : 26 May 2023

PERFORMANCE TEST (CMVR) REPORT

1	Customer's Name	M/s ESSEL ENERGY INFRA PRIVATE LIMITED
2	Customer's Address	PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122 001
3	Technical Specification No. & Date	SERF-01 & Dated :- 01/03/2023
4	Docket Id	CVTNESSESCCSC164977
5	Description Of Test Sample a) Model b) Type c) Category d) Manufacturer	SERF 2-Wheeler (Battery Operated Vehicle) L1 M/s ESSEL ENERGY INFRA PRIVATE LIMITED
6	Test Requirement	Compliance to the requirements of CMVR, 1989 as amended up to date.
7	Test Procedure	As per AIS - 126: 2014
8	Conclusion	Vehicle meets the compliance requirements of per AIS - 126: 2014.
9	Place of Issue	ICAT Centre II
10	Total No. of pages	04

Format No.: ICAT/VEL/F/22/04

Remarks : Refer page 04 of 04 for disclaimer.

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Rahul Upadhyay Asst. Manager	Karan Mahajan Dy. Manager	Keshav Kr. Tripathi Asst. General Manager	
			Page 01 of 04

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Centre-II : Plot No.-01, Sector-M-11, HSIIDC, IMT-Manesar, Gurugram-122050. Haryana (India)

Phone : 0124-4586111, Fax : +91-124-2290005. E-mail: team@icat.in, Website : www.icat.in

(An ISO 9001, ISO 14001 and ISO 45001 certified, scope wise NABL accredited and BIS recognised Test House)














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Date : 26 May 2023



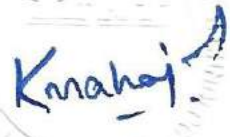
**PERFORMANCE TEST (CMVR) REPORT
SERF**

Motor No.	HC22110021	Date of Receipt of Sample (DUT)	26 April 2023
Chassis No.	MD9ESF0123C914001	Date of Performance of Test	28 April 2023
Test Site	ICAT Centre II	Fuel	Not Applicable

Physical/Functional verification of sample : ok

Rule No.	PARAMETER				TEST RESULTS
	ITEM	IDENTIFICATION	FUNCTION	COLOR	
124 (1) (18 - A)	Supplemental Engine Stop Control (OFF)		Control	--	Not Mandatory/Not Provided
	Supplemental Engine Stop Control (RUN)		Control	--	Not Mandatory/Not Provided
	Ignition Switch	--	Control	--	Provided & Complies
	Electric Starter		Control	--	Not Mandatory/Not Provided
	Manual Choke		Control	--	Not Mandatory/Not Provided
			Tell Tale	--	Not Mandatory/Not Provided
	Neutral (Gearbox Selection)		Tell Tale	--	Not Mandatory/Not Provided
	Manual Fuel Tank Shutoff Valve (OFF)		Control	--	Not Mandatory/Not Provided
	Manual Fuel Tank Shutoff Valve(ON)				
	Manual Fuel Tank Shutoff Valve(RES)				
	Speedometer	--	Indicator	--	Provided & Complies
	Audible Warning Device (Horn)		Control	--	Provided & Complies (L.H.S on Handle Bar)
	Driving Beam (Main, high or upper beam)		Control	--	Provided & Complies (L.H.S on Handle Bar)
			Tell Tale	Blue	Provided & Complies
	Passing Beam (Dipped, low or lower beam)		Control	--	Provided & Complies (L.H.S on Handle Bar)
			Tell Tale	--	Not Mandatory/Not Provided
Optical Warning Device	--	Control	--	Not Mandatory/Not Provided	
Fog Lamps - Front		Control	--	Not Mandatory/Not Provided	
		Tell Tale	--		
Fog Lamps - Rear		Control	--		
		Tell Tale	--		













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		Page 02 of 04




C T O V S 0861

Date : 26 May 2023

**PERFORMANCE TEST (CMVR) REPORT
SERF**

Rule No.	PARAMETER				TEST RESULTS
	ITEM	IDENTIFICATION	FUNCTION	COLOR	
124 (1) (18 - A)	Direction Indicators		Control	--	Provided & Complies
			Tell Tale	Green	
	Hazard Warning Signal		Control	--	Not Mandatory/Not Provided
			Tell Tale	--	
	Position Lamp		Control	--	Complies ¹
			Tell Tale	--	
	Master Lamp		Control	--	
			Tell Tale	--	
	Parking Lamp		Control	--	Not Mandatory/Not Provided
			Tell Tale	--	
	Fuel Indicator		Indicator	--	Not Mandatory/Not Provided
			Tell Tale	--	
	Engine Coolant temperature		Indicator	--	Not Mandatory/Not Provided
			Tell Tale	--	
	Electrical Charging		Indicator	--	Not Mandatory/Not Provided
			Tell Tale	--	
	Engine Oil		Indicator	--	Not Mandatory/Not Provided
			Tell Tale	--	
	Anti-lock Brake System Malfunction		Tell Tale	--	Not Mandatory/Not Provided
	Malfunction Indicator Lamp		Tell Tale	--	Not Mandatory/Not Provided
Engine Speed Control	--	Control	--	Provided & Complies (R.H.S on handlebar)	
Front Wheel Brake	--	Control	--	Provided & Complies (R.H.S on handlebar)	
Foot Rear Wheel Brake	--	Control	--	Not Mandatory/Not Provided	
Hand Rear Wheel Brake	--	Control	--	Provided & Complies (L.H.S on handlebar)	
Parking Brake	--	Control	--	Not Mandatory/Not Provided	
Clutch	--	Control	--	Not Mandatory/Not Provided	
Foot Selector Manual Gear Shift Control	--	Control	--	Not Mandatory/Not Provided	
Hand Selector Manual Gear Shift Control	--	Control	--	Not Mandatory/Not Provided	
State of Charge		Indicator	--	Provided & Complies	

Remarks :- ¹ Position lamp & Master lamp symbol need not appear if all lamps are automatically lit during vehicle operation. Tell-tale function is provided by means of instrument cluster illumination.

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		Page 03 of 04



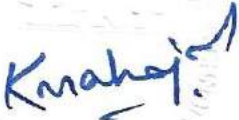

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<p>Rahul Upadhyay Asst. Manager</p>	<p>Karan Mahajan Dy. Manager</p>	



अंतर्राष्ट्रीय ऑटोमोटिव प्रौद्योगिकी केन्द्र
INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY
 [A Division of NATIP Implementation Society (NATIS), Govt. of India]

Non-Transferable

जाँच रिपोर्ट/TEST REPORT

यू.एल.आर संख्या/ULR No.:

T	C	5	3	6	0	2	3	0	5	0	0	0	0	1	6	8	F
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जाँच रिपोर्ट संख्या/ Test Report No.:

C	T	0	M	S	0	2	4	1
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दिनांक/Date: 21.03.2023

- 1.0 ग्राहक का नाम और पता/
NAME AND ADDRESS OF THE CUSTOMER
ग्राहक संदर्भ/CUSTOMER REFERENCE
ESSEL ENERGY INFRA PVT. LTD.
Plot No. - 55 Sector - 34 Gurugram-122001 Haryana INDIA
CVTNESSESCCSC164977; Dated: 28.02.2023
- 2.0 निर्माता का नाम और पता/
NAME AND ADDRESS OF THE MANUFACTURER
Same as mentioned in Sr. No. 1.0
- 3.0 परीक्षण संपत्ति का विवरण /
DESCRIPTION OF TEST PROPERTY
(Refer Sr. No. 17.0 – 19.0 for further details)
Vehicle Category: BOV 2W, L1
Tested Model Name: SERF
Base Model Name: SERF
Chassis No.: MD9ESF0123C914002
Motor No.: BL-12-60-1200
SR. No. - HC23010563
- 4.0 परीक्षण संपत्ति की प्राप्ति की तिथि/
DATE OF RECEIPT OF TEST PROPERTY
13.03.2023
- 5.0 परीक्षण संपत्ति की स्थिति/ CONDITION OF TEST PROPERTY: Prototype vehicle
- 6.0 परीक्षण उद्देश्य/ TEST OBJECTIVE: To conduct tests on vehicle model as mentioned in Sr. No. 3.0 as per AIS004 - Part 3 as amended up to September 2022.
- 7.0 परीक्षण विधि /TEST METHOD: As per AIS004 - Part 3 as amended up to September 2022.
- 8.0 परीक्षण विधि से कोई विचलन या बहिष्करण/ ANY DEVIATION OR EXCLUSION FROM TEST METHOD: NA
- 9.0 कार्यात्मक सत्यापन /FUNCTIONAL VERIFICATION: Electromagnetic Compatibility testing as per AIS004 - Part 3 as amended up to September 2022 for Radiated Emissions and Radiated Immunity on vehicle mentioned in Sr. No. 3.0.
- 10.0 निष्कर्ष/ CONCLUSION: Vehicle model "SERF" as mentioned in Sr. No. 3.0 of this report complies with the test requirements of AIS004 - Part 3 as amended up to September 2022 for Radiated Emissions & Radiated Immunity.
- 11.0 परीक्षण विवरण/TEST DESCRIPTION: Electromagnetic Compatibility testing as per AIS004 - Part 3 as amended up to September 2022 for Radiated Emissions and Radiated Immunity on vehicle mentioned in Sr. No. 3.0.
- 12.0 परीक्षण के निष्पादन की तिथि/DATE OF PERFORMANCE OF TEST: 15.03.2023 (Updated vehicle specification sheet received from customer on 21.03.2023)
- 13.0 परीक्षण स्थान/ LOCATION OF TEST: ICAT EMC Lab, Manesar




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 ANJANA SINHA Senior Engineer	 JEEVAN PAL Manager		 RAKESH KUMAR Assistant General Manager	

Page
1 of 22
[164977]

14.0 परीक्षण के परिणाम/TEST RESULTS: Test observations, photographs & graphs are included in Sr. No. 21.0-25.0 of this test report.

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10. Further, ICAT has the right, but not under obligation to initiate cancellation / withdrawal of the Test Reports/ Extension Reports/ Developmental Test Reports is/are issued in case of any fraud, misrepresentation, when it surfaces and comes in the knowledge of ICAT.
11. 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.
12. The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or

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			Page 2 of 22 [164977]
ANJANA SINHA Senior Engineer		JEEVAN PAL Manager	

15.0 परीक्षण के दौरान प्रदर्शन मानदंड/Performance Criteria during Tests

The following functional requirements should perform during testing as part of pass/fail criteria in addition to those mentioned:

Radiated Emission:

Radiated broadband electromagnetic emissions from vehicles:

For vehicles equipped with an internal combustion engine, the engine shall be in operation according to CISPR 12 (amendment 1, fifth edition 2005) clause 5.3.2. Typically for single cylinder engines, the engine speed shall be $2500 \pm 10\%$ rpm and for multi-cylinder (>1 cylinder) engines, the engine speed shall be $1500 \pm 10\%$ rpm.




For vehicles equipped with an electric propulsion motor, the vehicle shall be driven on a dynamometer without a load, or on non-conductive axle stands, with a constant speed of 40 km/h, or the maximum speed, if this is less than 40 km/h.

Other vehicle systems

All equipment capable of generating broadband emissions which can be switched on permanently by the driver or passenger should be in operation in maximum load, e.g. wiper motors or fans. The horn and electric window motors are excluded because they are not used continuously.

Radiated narrowband electromagnetic emissions from vehicles:

1. The ignition switch shall be switched on. The engine shall not be operating.
2. The vehicle's electronic systems shall all be in normal operating mode with the vehicle stationary.
3. All equipment which can be switched on permanently by the driver or passenger with internal oscillators > 9 kHz or repetitive signals should be in normal operation.




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ANJANA SINHA Senior Engineer		JEEVAN PAL Manager	Page 3 of 22 [164977]

Radiated Immunity:

Vehicle test conditions	Failure criteria
Vehicle speed 50 km/h (respectively 25 km/h for L1, L5 and L7 vehicles) \pm 20 per cent (Vehicle driving the rollers). If the vehicle is equipped with a cruise control system, it shall be operational.	Speed variation greater than \pm 10 per cent of the nominal speed. In case of automatic gearbox: change of gear ratio inducing a speed variation greater than \pm 10 per cent of the nominal speed.
Dipped beams ON (manual mode)	Lighting OFF
Front wiper ON (manual mode) maximum speed	Complete stop of front wiper
Direction indicator on driver's side ON	Frequency change (lower than 0.75 Hz or greater than 2.25 Hz). Duty cycle change (lower than 25 per cent or greater than 75 per cent).
Adjustable suspension in normal position	Unexpected significant variation
Driver's seat and steering wheel in medium position	Unexpected variation greater than 10 per cent of total range
Alarm unset	Unexpected activation of alarm
Horn OFF	Unexpected activation of horn
Airbag and safety restraint systems operational with inhibited passenger airbag if this function exists	Unexpected activation
Automatic doors closed	Unexpected opening
Adjustable endurance brake lever in normal position	Unexpected activation

Radiated Immunity:

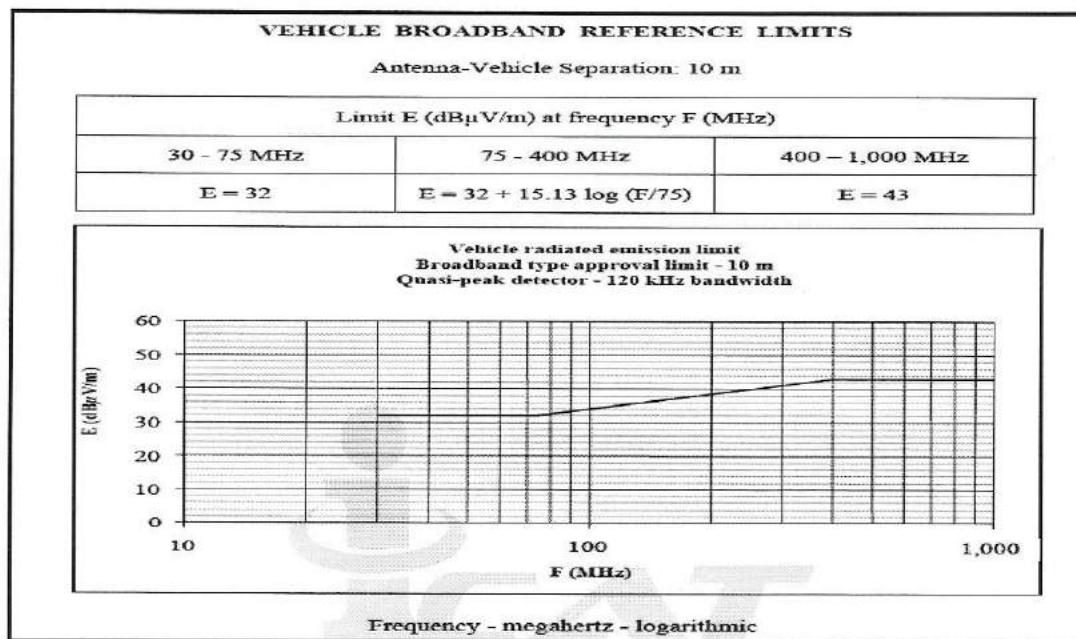
"Brake cycle" vehicle test conditions	Failure criteria
To be defined in brake cycle test plan. This must include operation of the brake pedal (unless there are technical reasons not to do so) but not necessarily an anti-lock brake system action.	Stop lights inactivated during cycle Brake warning light ON with loss of function. Unexpected activation

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16.0 योग्यता मानदंड/QUALIFYING CRITERIA (as per standard):

Sr. No.	Description	Qualifying Criteria
1	Radiated Emission	On the vehicle representative of its type, the measured values, expressed in dB microvolts/m, shall be below the type approval limit.
2	Radiated immunity	There shall be no degradation of performance of "immunity related functions".

Radiated Emission type approval limits:

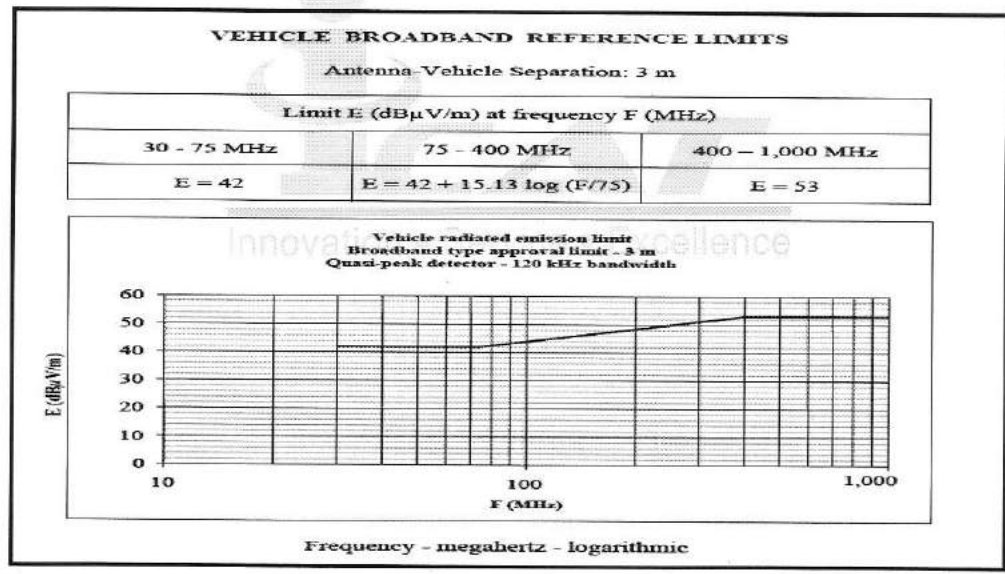
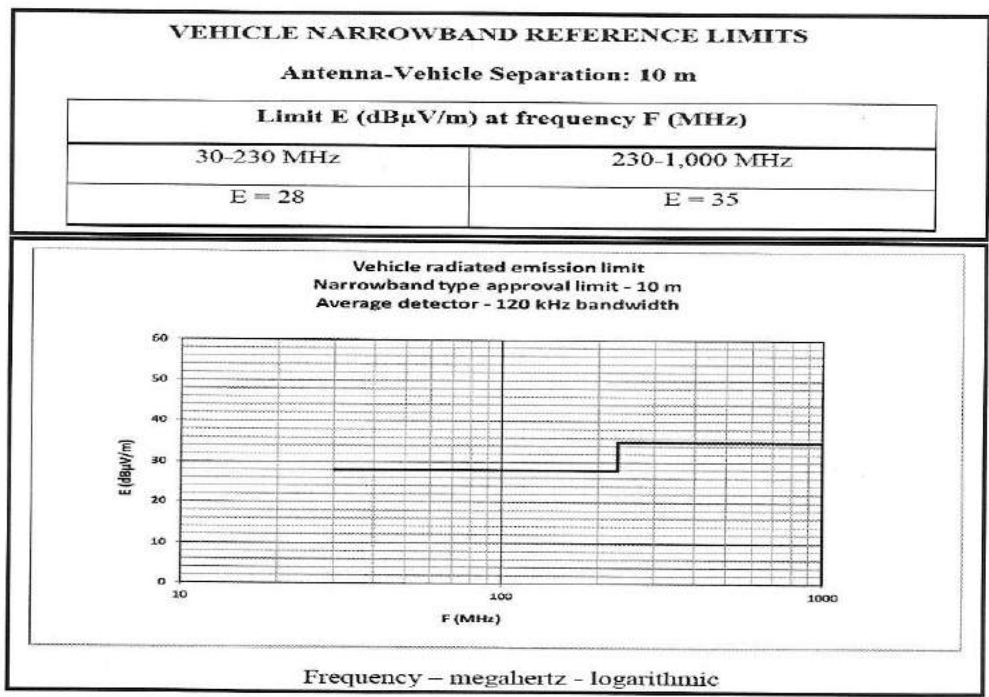


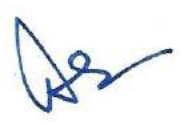


Note: Measurements can be performed with either quasi-peak or peak detectors. The limits above are for quasi-peak detectors. If peak detectors are used a correction factor of 20 dB as defined in CISPR 12 (amendment 1, fifth edition 2005) shall be applied.

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ANJANA SINHA Senior Engineer	JEEVAN PAL Manager		

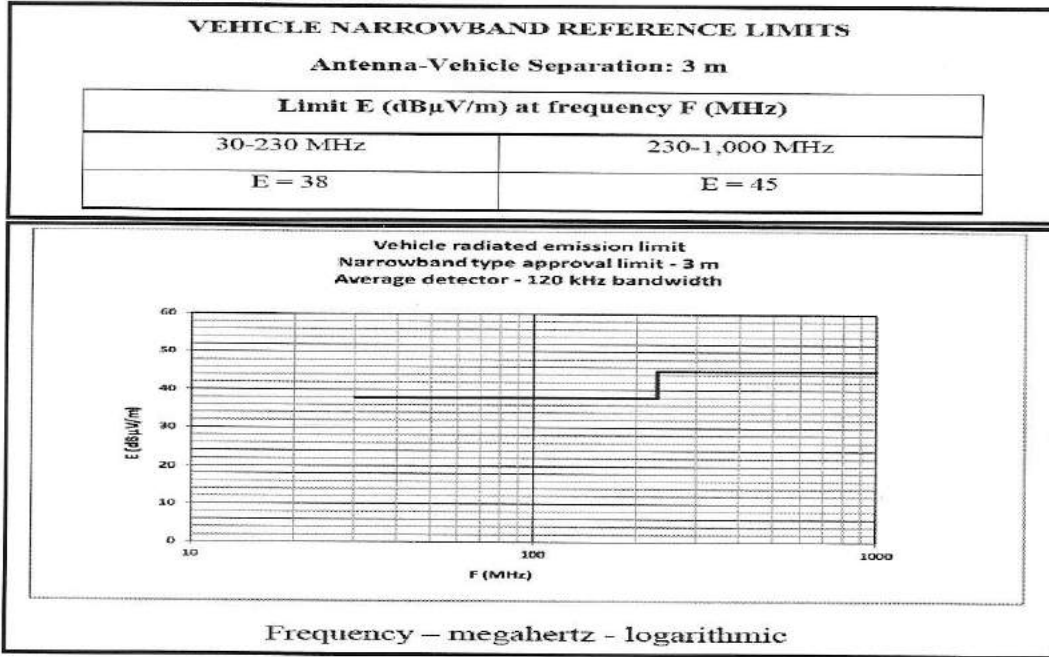
Radiated Emission type approval limits:

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Radiated Emission type approval limits:



"Immunity related functions" are:




- (a) Functions related to the direct control of the vehicle:
 - (i) By degradation or change in: e.g. engine, gear, brake, suspension, active steering, speed limitation devices;
 - (ii) By affecting drivers position: e.g. seat or steering wheel positioning;
 - (iii) By affecting driver's visibility: e.g. dipped beam, windscreen wiper.
- (b) Functions related to driver, passenger and other road user protection:
 - (i) e.g. airbag and safety restraint systems.
- (c) Functions which when disturbed cause confusion to the driver or other road users:
 - (i) optical disturbances: incorrect operation of e.g. direction indicators, stop lamps, end outline marker lamps, rear position lamp, light bars for emergency system, wrong information from warning indicators, lamps or displays related to functions in subparagraphs (a) or (b) which might be observed in the direct view of the driver;
 - (ii) Acoustical disturbances: incorrect operation of e.g. anti-theft alarm, horn.
- (d) Functions related to vehicle data bus functionality: (i) by blocking data transmission on vehicle data bus-systems, which are used to transmit data, required to ensure the correct functioning of other immunity related functions.
- (e) Functions which when disturbed affect vehicle statutory data: e.g. tachograph, odometer.

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17.0 वाहन की सूचना / VEHICLE DETAILS

17.1	Vehicle Type & Category	BOV 2W, L1
17.2	Dimensions of Vehicle	
17.2.1	Height (mm)	1175
17.2.2	Length (mm)	1920
17.2.3	Width (mm)	710
17.2.4	Wheelbase (mm)	1350
17.3	Drive Train	
17.3.1	General	
17.3.2	Make	EMF Innovations Pvt. Ltd.
17.3.3	Country of Origin	Indigenous
17.3.4	Type	BLDC
17.3.5	Test Voltage	60V
17.3.6	Max Power	1200 watts
17.4	Traction Motor	
17.4.1	Make	EMF Innovations Pvt. Ltd.
17.4.2	Country of Origin	Indigenous
17.4.3	Identification No.	BL-12-60-1200
17.4.4	Working Principle	BLDC
17.5	Power Controller/ Traction	
17.5.1	Make	EMF Innovations Pvt. Ltd.
17.5.2	Country of Origin	Indigenous
17.5.3	Identification No	BH-60-1200
17.5.4	Type	BLDC
17.5.5	Control Principle	Open Loop
17.5.6	Max Effective Current Supplied to Motor	40A
17.5.7	Voltage Range	52 Volt DC to 69.5 Volts. DC
17.5.8	Hardware Version	HW60-BLDC1.0
17.5.9	Software Version	SW60-BLDC1.0
17.6	Traction Battery	
17.6.1	Make	Pixcell E-Mobility Pvt. Ltd.
17.6.2	Country of Origin	Indigenous
17.6.3	Identification No.	PXL – 6060 – M1
17.6.4	Nominal Voltage	59.2V
17.6.5	Battery Energy	3.433 kWh
17.6.6	Battery Capacity, Ah in 2h	58 Ah

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 ANJANA SINHA Senior Engineer		 JEEVAN PAL Manager	

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दिनांक/Date: 21.03.2023

17.0 वाहन की सूचना / VEHICLE DETAILS

17.7	Charger	
17.7.1	Make	NEENJAS ELECTRIC Model - NEV-900NWP-LX-60
17.7.2	Country of Origin	Indigenous
17.7.3	Type (on board/external/without)	External
17.7.4	Charging current: DC / AC (number of phases/frequency)	90-280VAC/47-63Hz
17.7.5	Maximal nominal current (in each mode if necessary)	69.5V 12A
17.7.6	Nominal charging voltage	69.5V 12A
17.7.7	Charging Protocol (CHAdeMo, CCS, Type II, etc.)	Proprietary interface using CAN Protocol
17.7.8	Basic vehicle interface functions: ex: L1/L2/L3/N/E/control pilot	L1
17.8	Vehicle Modes	
17.8.1	Types of Modes (EVs) (Speed/Torque/Voltage/Current)	There are 3 Modes Provided, No any default mode and 3rd is the worst mode. In 3rd Mode Speed – 51 kmph, Voltage – 60V, Peak Current – 40A
17.8.2	Details about Modes (Voltage/Current)	Voltage – 60V 1st Gear – 30 kmph @ 12A 2nd Gear – 40 kmph @ 17A 3rd Gear – 51 kmph @ 22A

18.0 वाहन पर जोड़े गए ईएमआई/ईएमसी शमन घटकों की सूची /LIST OF EMI/EMC MITIGATION COMPONENTS ADDED ON THE VEHICLE

Sr. No.	Description	Location	Make	ID No. / Part No.	Photo
1.	Ferrite Bead	On DC Converter	Wurth	74271131 (1 nos.)	
2.	Shielded Throttle used, Make- Auto Wires				
3.	Instrument Cluster changed, Make- Auto Wires				
4.	Shielded Wiring Harness, Make- Auto Wires				



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ANJANA SINHA Senior Engineer	JEEVAN PAL Manager	Page 9 of 22 [164977]



19.0 इलेक्ट्रॉनिक नियंत्रण इकाइयों/विद्युत घटकों की सूची/ LIST OF ELECTRONIC CONTROL UNITS/
 ELECTRICAL COMPONENT

Sr. No.	ECU/Electrical Components	Make	Country of Origin	ID No. / Part No.	Hardware version	software version
•	Instrument Cluster	AUTO WIRES PVT. LTD.	Indigenous	AWCT-01	-	-
•	Speedometer	Parts of Instrument cluster				
•	Odometer	Parts of Instrument cluster				
•	Hazard/Flasher Controller	AUTO WIRES	Indigenous	AW-FL-1208	-	-
•	DC to DC Converter	SEECO INDUSTRIES	Indigenous	DC-111	CT-01-AB-48-12	-
•	MCB/Circuit breakers/electric safety devices	C&S	-	-	-	-
•	Battery Management System (BMS)	Pixcell E-Mobility Pvt. Ltd.	-	PXL-E001-CAN	-	31.1
•	Wheel rim integrated with Hub Motor	EMF	-	KLASSIC 12 X 2.15, 25.11.21	-	-
•	Electronic throttle	AUTO WIRES, PVG	-	-	-	-
•	Electrical switches	SAP SWISS, AUTO WIRES	-	-	-	-
•	Sensors (if any, to be declared) Side stand sensor	Envirio, Seeko	-	-	-	-
•	Horn	RAJULEX	Indigenous	Id: JBI-118 TAC: RK 2342	-	-
•	Lighting & signalling devices					
•	Head Lamp (HL)	KK LIGHT	Indigenous	ID: KR-9371 TAC: AN3897	-	-
•	Rear Combination Lamp (RCL)/ Tail Lamp (TL)	KK LIGHT	Indigenous	ID: KR-9373 TAC: AN4369	-	-
•	Stop Lamp (SL)	KK LIGHT	Indigenous	ID: KR-9373 TAC: AN4369	-	-
•	Left Direction Indicator (FDI)	KK LIGHT	Indigenous	ID: KR-9390 TAC: AN4371	-	-
•	Right Direction Indicator (FDI)	KK LIGHT	Indigenous	ID: KR-9373 TAC: AN4369	-	-
•	Right Direction Indicator (RDI)	KK LIGHT	Indigenous	ID: KR-9373 TAC: AN4369	-	-
•	Left Direction Indicator (RDI)	KK LIGHT	Indigenous	ID: KR-9371 TAC: AN3897	-	-
•	Front Position Lamp (FPL)	KK LIGHT	Indigenous	ID: KR-9371 TAC: AN3897	-	-
•	Rear Position Lamp (RPL) (if not part of RCL/TL)	Part of RCL				
•	Rear Registration Plate Lamp (RRPL)	KK LIGHT	Indigenous	ID: KR-9179 TAC: CM7014	-	-
•	Reflectors	Rear - HILUX Side - HILUX	Indigenous	ID: KM-202 TAC: RK2394 ID: KM-101 TAC: AG0039	-	-

*Remarks-Mentioned ECU/Electrical component list is as per manufacturer declaration.

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 ANJANA SINHA Senior Engineer	 JEEVAN PAL Manager






20.0 परीक्षण और अंशांकन विवरण में प्रयुक्त उपकरणों की सूची/TEST INSTRUMENTS AND EQUIPMENT

Lab ID	Name of Instruments	Manufacturer	Model (S. No.)	Calib. due date
Radiated Emission				
ICAT/EMC/ETR/03	EMI Test Receiver	Keysight Technologies	N9038A (MY56400078)	17/04/2023
ICAT/EMC/EPA/06	External Preamplifiers	Rohde and Schwarz	BBV 9745 (00422)	10/05/2023
ICAT/EMC/OFBA-16	Bi Log Antenna	TDK RF Solutions	HLP-2006C (131176)	22/09/2024
Radiated Immunity (ALSE)				
ICAT/EMC/OFBA-11	Bi conical Antenna	TDK RF Solutions	HBA 2010 (130840)	-
ICAT/EMC/OFBA-07	V Log Array Antenna	TDK RF Solutions	VLA-8001 (131231)	-
ICAT/EMC/OFBA-10	Horn Antenna	TDK RF Solutions	ATH800M6GM1 (0353219)	-
ICAT/EMC/SG/04	Signal Generator	Agilent Technologies	N5181A (MY50141406)	06/10/2023
ICAT/EMC/SG/03	Signal Generator	Keysight Technologies	N5173B (MY57280827)	29/10/2025
ICAT/EMC/PM/02	RF Power Meter	Agilent Technologies	N1914A (MY58210024)	24/08/2024
ICAT/EMC/PM/04	RF Power Meter	AR RF	PM 2003 (581932)	28/10/2025
ICAT/EMC/PS/04	Power Sensor	AR RF	PH2004A (582088)	16/02/2024
ICAT/EMC/PS/03	Power Sensor	AR RF	PH2004A (582089)	16/02/2024
ICAT/EMC/AMP-08	Amplifier	AR	2000W1000D (352818)	-
ICAT/EMC/AMP-04		AR	250S1G6M3 (353225)	-
ICAT/EMC/AMP-07		AR	10000A225A (581864)	-
ICAT/EMC/FP/03	Field Probe	AR	FL7030 (0337096)	04/07/2023
ICAT/EMC/FP/01			FL7018 (0337094)	20/11/2023
ICAT/EMC/FP/09			FL7218 (0349492)	18/07/2023
ICAT/EMC/FP/02			FL7030 (0337095)	04/07/2023

21.0 RADIATED EMISSIONS TEST

21.1 Test Details

Ambient Temperature	23° C	
Relative Humidity	57%	
Vehicle Conditions during Test	Broadband: 1. Motor: ON 2. Motor Speed: 40 km/h 3. Dipped Beam: ON 4. Direction Indicator: ON	Narrowband: 1. Ignition: ON 2. Motor: OFF 3. Dipped Beam: ON 4. Direction Indicator: ON
Frequency Range	30 MHz – 1 GHz	
Antenna Polarization	Horizontal and Vertical	
Receiver Bandwidth & Step Size	120 kHz, 50 kHz	
Measurement Time	5 ms	
Detector	Broadband: Peak	Narrowband: Average
Antenna Height & Antenna Phase Centre Distance From Vehicle Reference Point	3 m, 10 m	

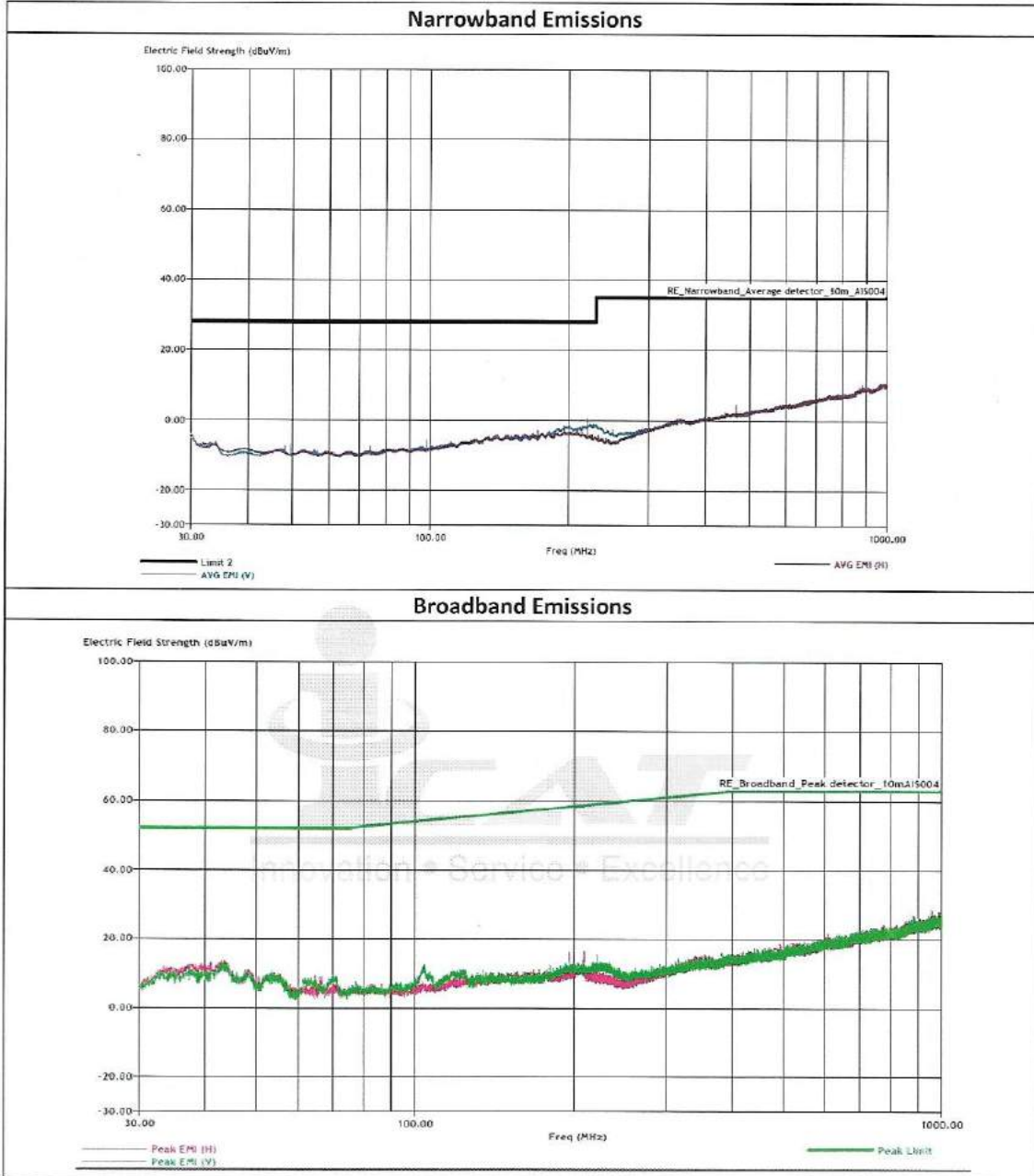
Prepared By		Checked & Authorized By	Page 11 of 22 [164977]
 ANJANA SINHA Senior Engineer		 JEEVAN PAL Manager	

T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F



C T 0 M S 0 2 4 1

दिनांक/Date: 21.03.2023

21.2 Ambient Graph



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ANJANA SINHA Senior Engineer	JEEVAN PAL Manager	



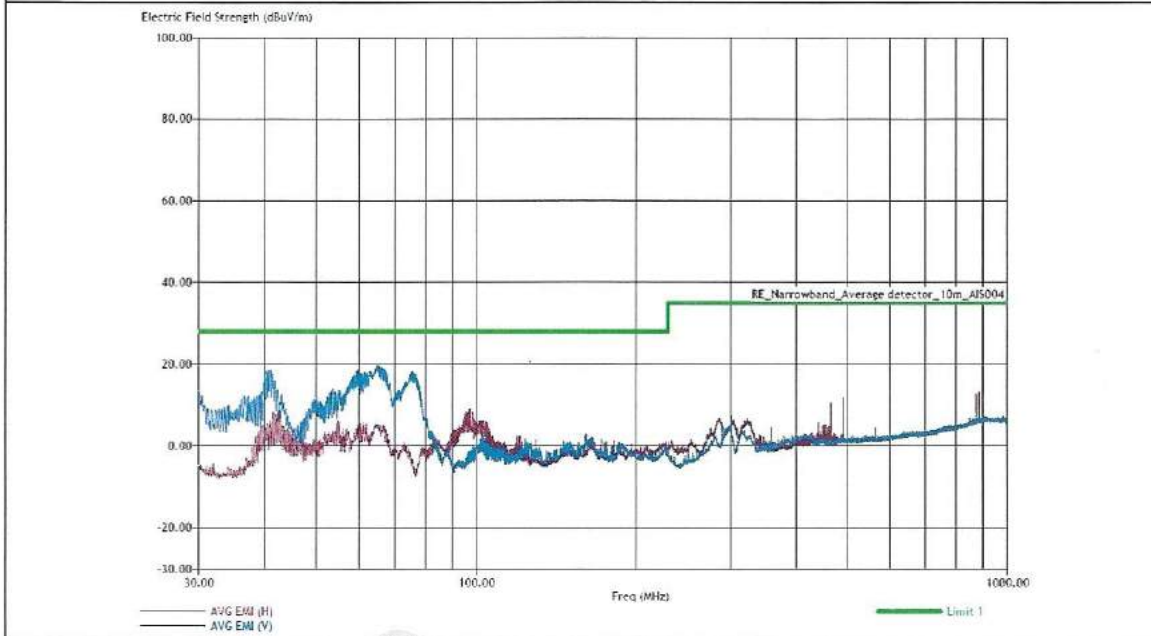
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C T 0 M S 0 2 4 1

दिनांक/Date: 21.03.2023




21.3 Test Measurements

Narrowband Emissions: Vehicle Side – Left: Horizontal and Vertical Polarization: 30 MHz to 1 GHz



21.4 Test Table

Radiated Emissions_30MHz_1GHz Vertical & Horizontal Polarization				
Freq(MHz)	(AVG) EMI (H) (dBµV/m)	(AVG) EMI (V) (dBµV/m)	(2) Limit(dBµV/m)	
30	-4.73	13.55	28	
82.8	-1.67	2.6	28	
113.4	-1.94	-2.56	28	
264.45	-1.65	-2.33	35	
355.2	-0.74	-0.39	35	
484.1	1.23	1.63	35	
560.4	1.6	1.6	35	
649	2.73	2.47	35	
767.4	4.58	4.29	35	
855.75	5.33	5.47	35	
917.55	6.38	6.51	35	
1000	6.67	6.56	35	

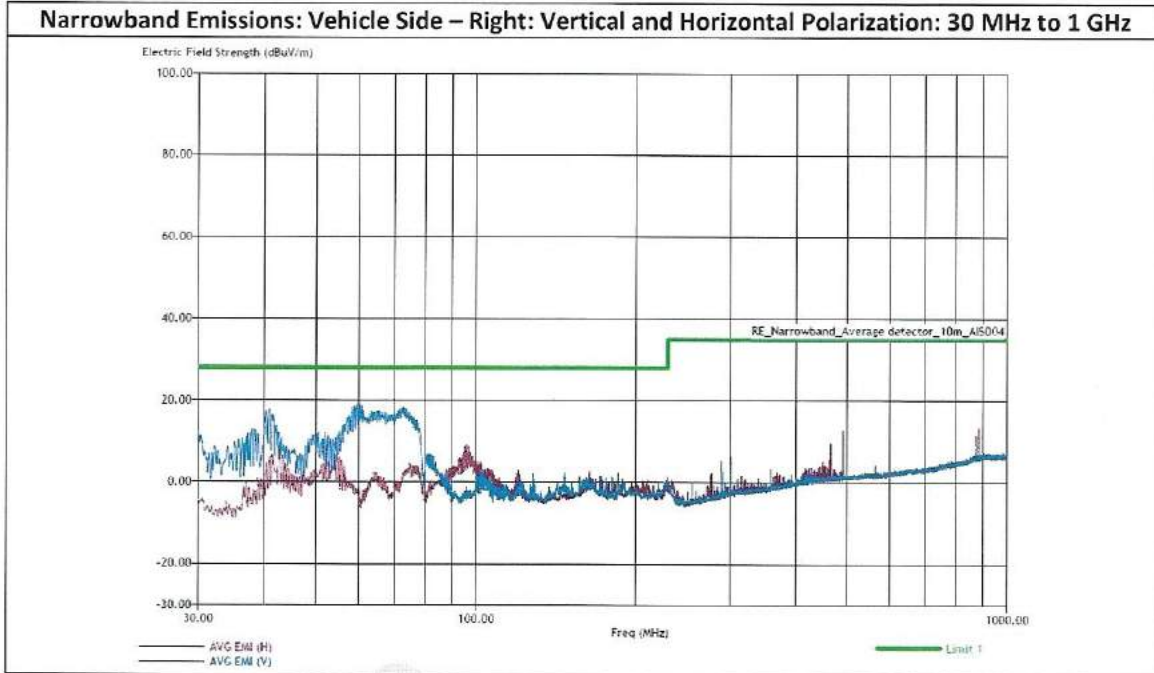
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 ANJANA SINHA Senior Engineer		 JEEVAN PAL Manager

T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F

C T 0 M S 0 2 4 1



दिनांक/Date: 21.03.2023

21.5 Test Measurements



21.6 Test Table

Radiated Emissions_30MHz_1GHz Vertical & Horizontal Polarization			
Freq(MHz)	(AVG) EMI (H) (dBµV/m)	(AVG) EMI (V) (dBµV/m)	(2) Limit(dBµV/m)
30	-4.54	11.95	28
42.7	7.84	7.59	28
108.95	0.79	-1.56	28
216.75	-3.52	-2.89	28
349.45	-1.03	-1.91	35
455.05	1.32	0.96	35
571.2	1.77	2.12	35
634.4	2.7	2.2	35
742.3	3.55	3.56	35
824.65	4.65	5.13	35
942.95	6.26	6.43	35
1000	6.55	6.33	35

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 ANJANA SINHA Senior Engineer	 JEEVAN PAL Manager

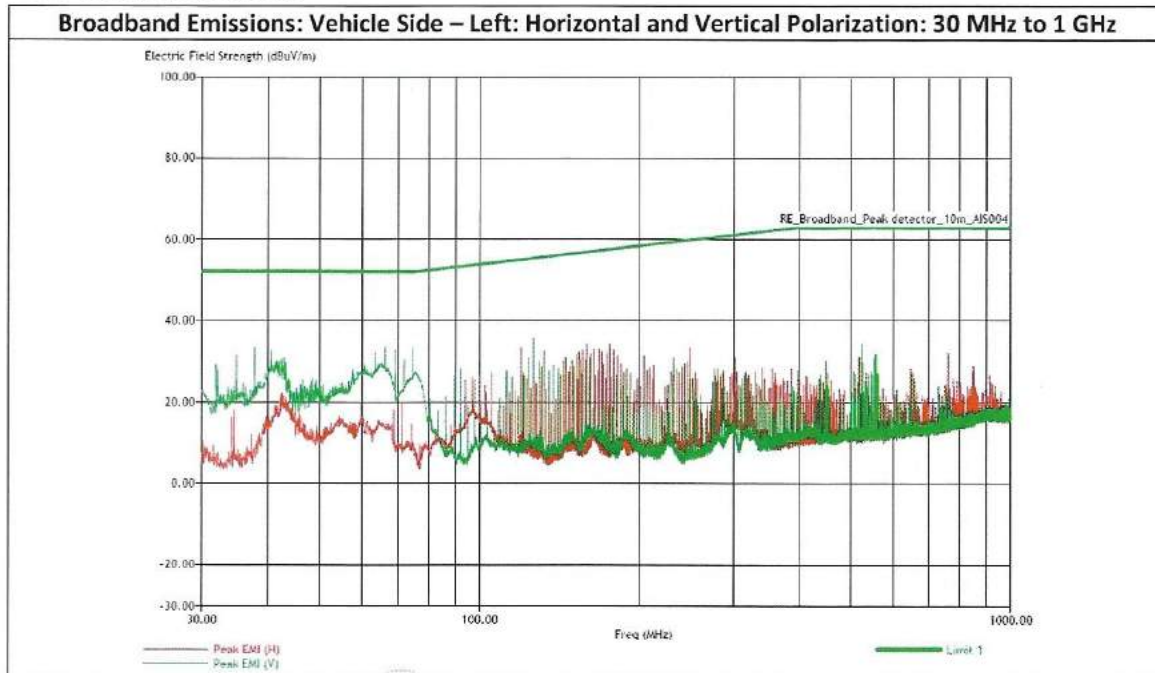


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C T O M S 0 2 4 1




दिनांक/Date: 21.03.2023

21.7 Test Measurements



21.8 Test Table

Radiated Emissions_30MHz_1GHz Vertical & Horizontal Polarization			
Freq(MHz)	(PEAK) EMI (H) (dBμV/m)	(PEAK) EMI (V) (dBμV/m)	(1) Limit(dBμV/m)
30	7.47	22.54	52
78.45	9.02	21.51	52.3
137.65	6.31	7.75	55.99
251.85	10.57	7.22	59.96
353.65	9.19	10.41	62.19
458.85	12.15	10.89	63
572.7	13.29	13.21	63
670.45	13.25	12.74	63
766.5	14.32	15.45	63
856.3	16.95	15.82	63
961.8	16.08	16.91	63
1000	17.67	16.67	63

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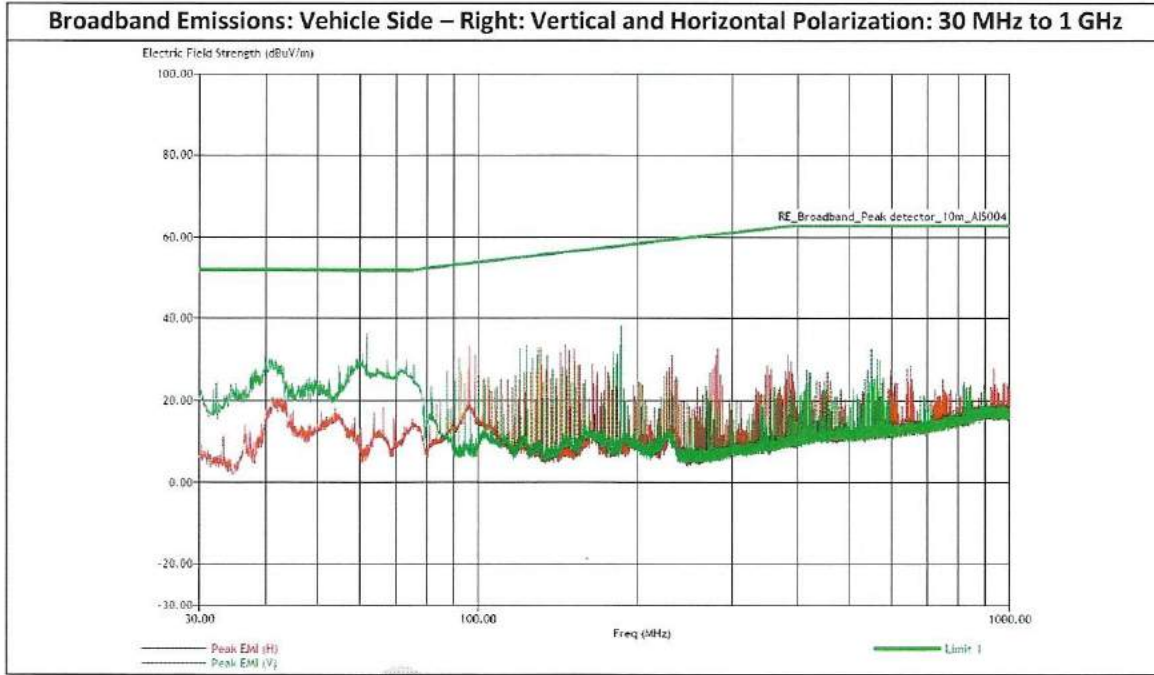
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C T 0 M S 0 2 4 1

दिनांक/Date: 21.03.2023




21.9 Test Measurements

Broadband Emissions: Vehicle Side – Right: Vertical and Horizontal Polarization: 30 MHz to 1 GHz



21.10 Test Table

Radiated Emissions_30MHz_1GHz Vertical & Horizontal Polarization			
Freq(MHz)	(PEAK) EMI (H) (dBμV/m)	(PEAK) EMI (V) (dBμV/m)	(1) Limit(dBμV/m)
30	6.56	20.42	52
85	10.5	20.41	52.82
152.55	6.76	29.37	56.67
233.15	13.97	10.71	59.45
340.55	11.29	8.08	61.94
444.15	12.5	10.19	63
520.15	12.63	12.56	63
649.1	13.47	13.8	63
733.75	13.26	13.3	63
843.55	15.95	15.91	63
933.9	17.41	17.38	63
1000	16.67	16.85	63

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22.0 RADIATED IMMUNITY TEST

22.1 Test Details

Ambient Temperature	23° C
Relative Humidity	57%
Vehicle Conditions during Test	"25 km/h cycle" Vehicle Speed: 25 km/h Dipped Beam: ON Direction Indicator: ON
Parameters & Signals Monitored	Speedometer Dipped Beam Horn Actuation Direction Indicator
Frequency Range	20 MHz – 2000 MHz
Step Size	20-200MHz: 5MHz 200-400MHz: 10MHz 400-1000MHz: 20MHz 1000-2000MHz: 40MHz
Field Strength	30 V/m
Dwell Time	2 s
Antenna Polarization	Vertical
Modulation Type	AM (20 MHz – 800 MHz) – Amplitude modulation with 1 kHz modulating frequency and 80 % of modulation depth. PM (800MHz – 2000MHz)– Pulse modulation: Ton: 577µs, period: 4600µs
Antenna Phase Centre distance from Vehicle Reference point	20MHz-90MHz: 4.05m 90MHz-800MHz: 3.82m 800MHz-2000MHz: 4.15m
Vehicle Facing	Front

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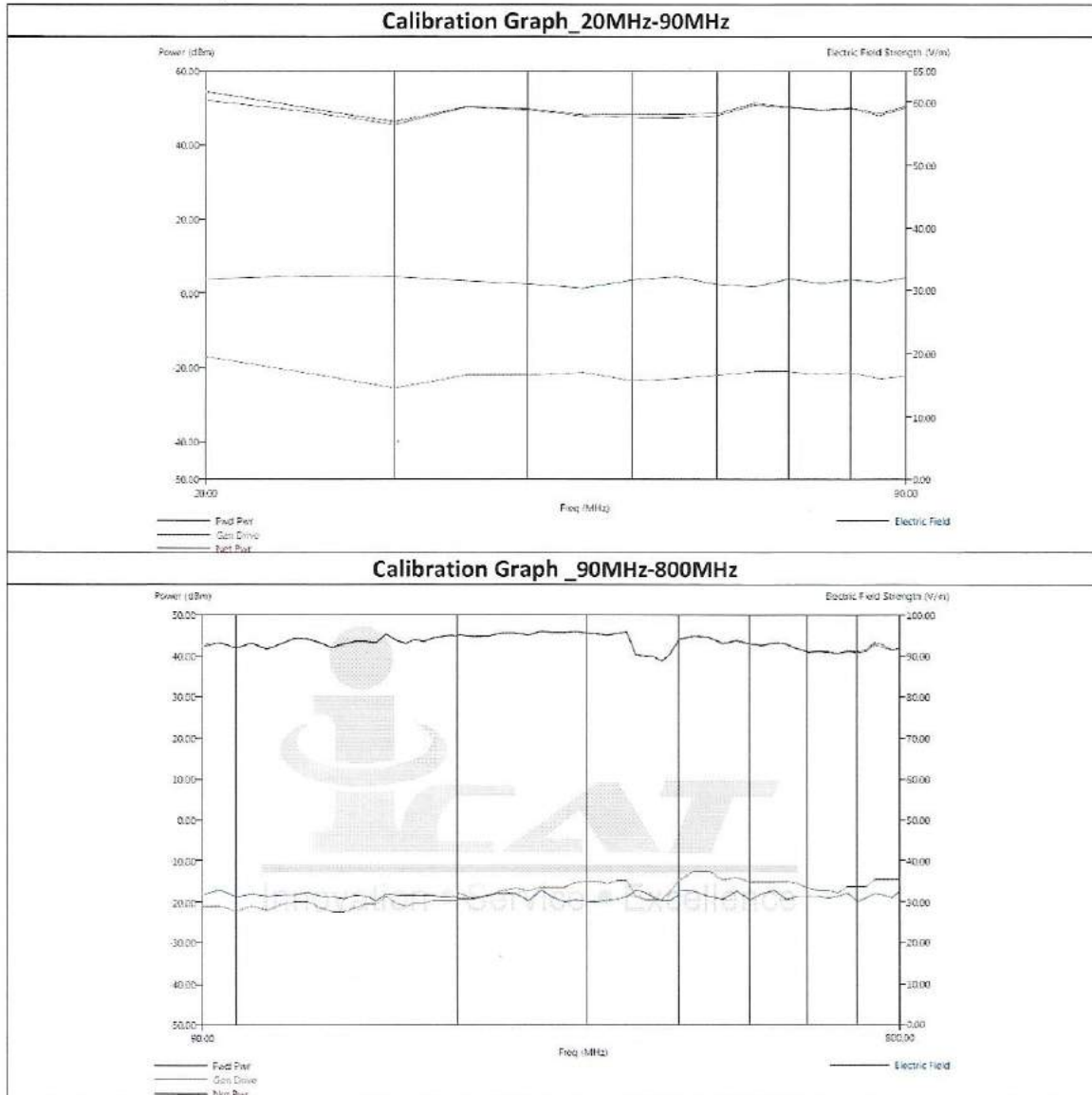
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T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F

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दिनांक/Date: 21.03.2023

22.2 Calibration Graph



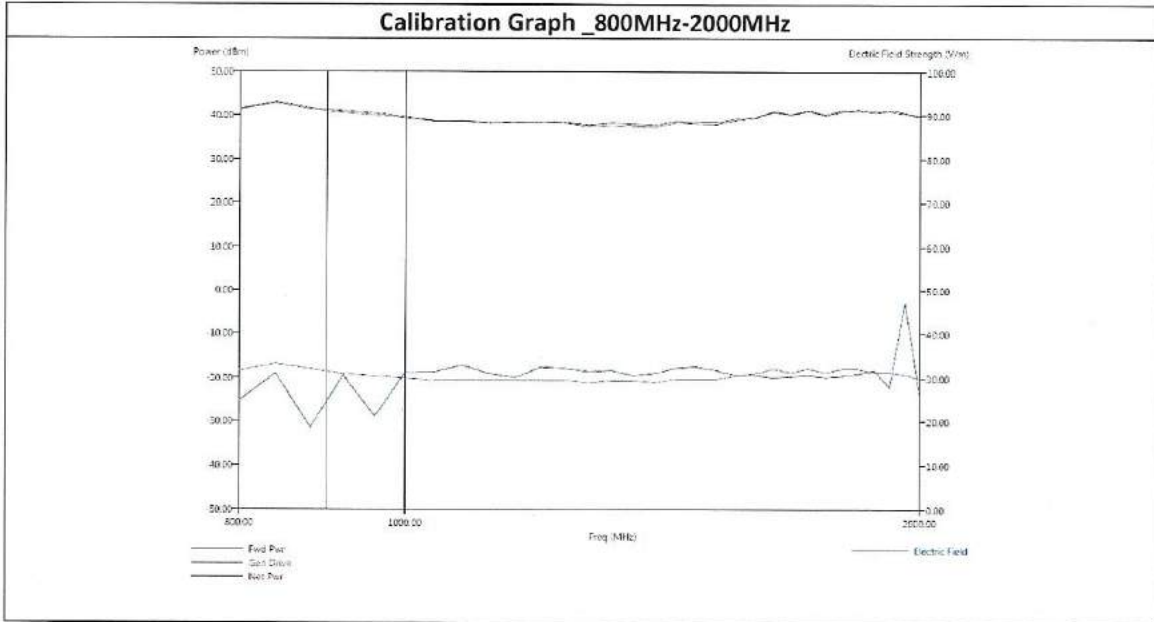
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T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F

C T 0 M S 0 2 4 1

दिनांक/Date: 21.03.2023




22.2 Calibration Graph



23.0 Observations

Test vehicle, as mentioned in Sr. No. 3.0 of this report, complies with the requirements of AIS004 - Part 3 as amended up to September 2022 for Radiated Emissions Test (30 MHz to 1000 MHz) & Radiated Immunity Test 30 V/m (20 MHz to 2000 MHz).

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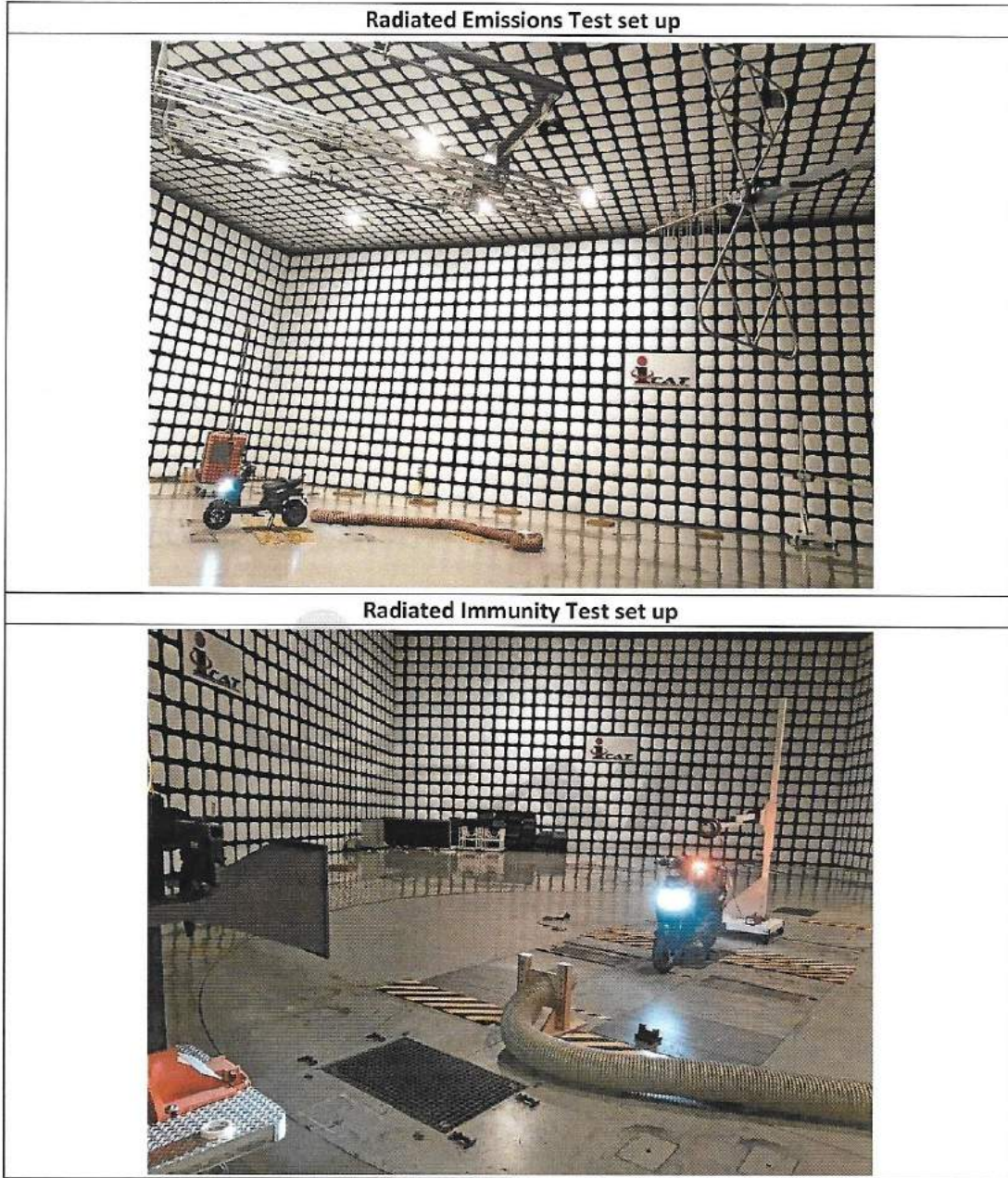
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<p>ANJANA SINHA Senior Engineer</p>		<p>JEEVAN PAL Manager</p>	<p>Page 19 of 22 [164977]</p>




T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F

C T 0 M S 0 2 4 1

दिनांक/Date: 21.03.2023

24.0 Test Setup Photographs



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ANJANA SINHA Senior Engineer		JEEVAN PAL Manager	

T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F

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दिनांक/Date: 21.03.2023




25.0 Vehicle Photographs

Left Hand Side



Right Hand Side



<p>Prepared By</p> 		<p>Checked & Authorized By</p> 	<p>Page 21 of 22 [164977]</p>
<p>ANJANA SINHA Senior Engineer</p>		<p>JEEVAN PAL Manager</p>	

T C 5 3 6 0 2 3 0 5 0 0 0 0 1 6 8 F

C T 0 M S 0 2 4 1

दिनांक/Date: 21.03.2023

25.0 Vehicle Photographs




Front Side



Rear Side



-----End of Report-----

Prepared By		Checked & Authorized By	
			
<p>ANJANA SINHA Senior Engineer</p>		<p>JEEVAN PAL Manager</p>	<p>Page 22 of 22 [164977]</p>

अंतर्राष्ट्रीय ऑटोमोटिव प्रौद्योगिकी केन्द्र
INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY
[A Division of NATRIP Implementation Society (NATIS), Govt. of India]

Non - Transferable

TEST REPORT

Test Report No. :

C T O C S 1 3 0 9

Date: 28.06.2023

1.	Name & Address of Customer	M/s. ESSEL ENERGY INFRA PRIVATE LIMITED PLOT NO. 55, Sector -34, Gurgaon, Haryana, 122001
2.	Customer's Reference	Docket No. 164977
3.	Description of Test Component	Pillion Hand Hold as installed on the vehicle (With One-Piece Hand Grip) (ICAT-CTL/164977/01)
4.	Application on Vehicle Model	SERF
5.	PHH manufacturing plant address	M/s. Om Steel Industries B-XXIX-536/21-3, Industrial Area-C, Single Cycle Road, Dhandari Kalan, Ludhiana-141010
6.	Part No.	ESPHH1
7.	Drawing No.	SERF-08
8.	Material	MS
9.	Flange Bolt	M8X50 (3 Nos.)
10.	Engine No./Motor No./Motor ID	BL-12-60-1200/HC22110021
11.	Chassis No.	MD9ESF0123C914001
12.	Test Objective	To conduct the testing of Pillion Hand Hold for 2-Wheeled Vehicle & as installed on vehicle as per Standard: IS: 14495 – 1998 (reaffirmed 2018).
13.	Test Standard	IS: 14495 – 1998 (reaffirmed 2018).
14.	Date of Performance of Test	27.06.2023
15.	Test Results/Test Observations	For Test Results/Test Observations, please refer Annexure-I . Please refer Annexure-II for photograph of test setup used.
16.	Conclusion	The Pillion Hand Hold having One-Piece Hand grip specified in Sr. No. 3 of this test report, withstood without snapping a vertical traction force of 2000 N (200 kg) applied statically to the center of the surface of the Hand grip at a maximum pressure of 2 MPa when tested, and met the test requirements of Clause No. 2 & its sub clause 2.2 of IS: 14495 – 1998 (reaffirmed 2018).

Prepared By	Checked & Authorized By	Approved By	
			
JATIN WADHWA	HARISH JOSHI	AMIT KARWAL	
Senior Engineer	Manager	Deputy General Manager	Page 1 of 4 + Dwg. (01) [164977]


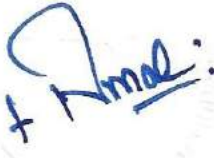

Test Report No. :

C T O C S 1 3 0 9

Date: 28.06.2023

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12. The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.

Prepared By	Checked & Authorized By	
		
<p>JATIN WADHWA Senior Engineer</p>	<p>HARISH JOSHI Manager</p>	<p>Page 2 of 4 + Dwg. (01) [164977]</p>

Test Report No. :




C	T	0	C	S	1	3	0	9
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Date: 28.06.2023

Annexure-I

1.0 TEST REQUIREMENTS, OBSERVATIONS & RESULTS:

Sr. No.	TESTS & CL. NO.	REQUIREMENTS	RESULTS
1.	General Requirements (Cl. No.2)	Where provision is made for carriage of pillion, the vehicle shall be fitted with pillion hand-holds system, in the form of a strap or a hand grip(s). The pillion hand holds system shall be so fitted that it is convenient for the pillion rider to make use of it in his normal sitting position, irrespective of whether he is sitting side or cross saddled.	Hand Grip (Complied)
2.	Testing of Hand Grip (Cl. No. 2.2) {If one hand grip} →	The hand grip shall be designed in such a way that it is able to withstand, without snapping, a vertical traction force of 2000 N (200 kg) applied statically to the centre of the surface of hand-grip at a maximum pressure of 2 MPa.	Complied
	{If two hand grips} →	If two hand-grips are used, these shall be fitted one on each side is able to withstand without snapping a vertical traction forces of 1000 N (100 kg) applied statically to the centers of the surface of individual hand-grips at a maximum pressure of 1 MPa.	NA

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JATIN WADHWA	HARISH JOSHI	Page 3 of 4
Senior Engineer	Manager	+ Dwg. (01) [164977]

Test Report No. :

C	T	0	C	S	1	3	0	9
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Date: 28.06.2023

Annexure-II




Vehicle Model: SERF

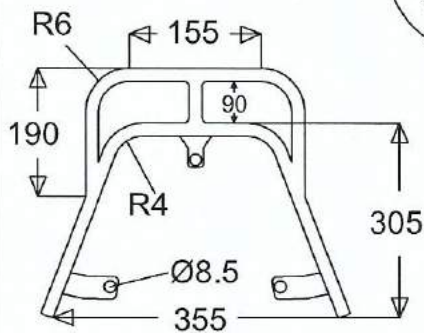
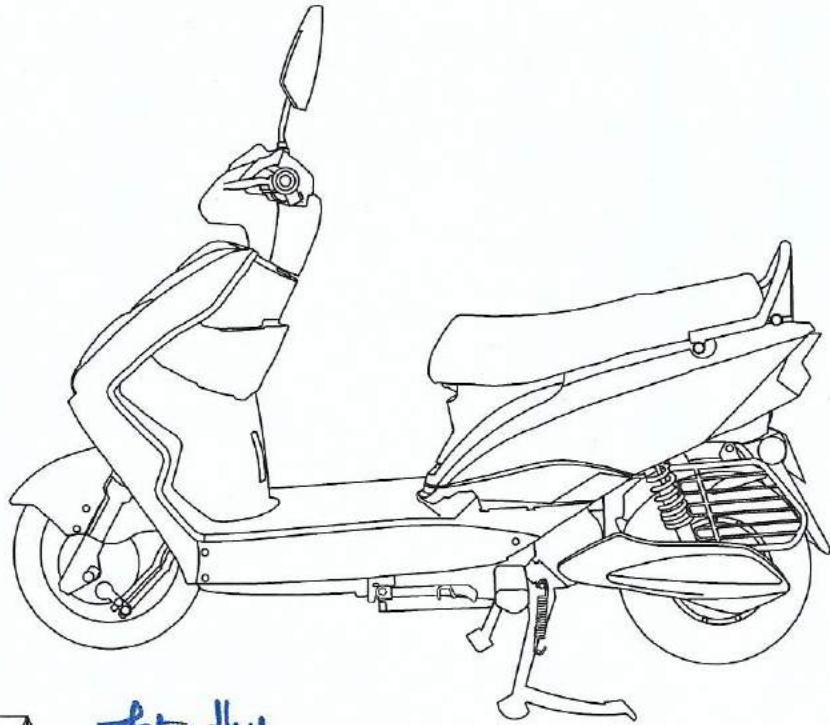


→ Load Cell

→ Pillion Hand Hold

→ Test Vehicle

Prepared By	Checked & Authorized By	
		
JATIN WADHWA Senior Engineer	HARISH JOSHI Manager	Page 4 of 4 + Dwg. (01) [164977]



Part Name - Pillion Hand Hold
 Part no.- ESPHH1
 Material- MS
 Mounting- MS 10.8 Grade Bolt
 Hex Head M8 x 50 mm
 3 Mounting by MS
 Hex Bolt M8x50mm

T.P.No. CY0CS1309 dtd. 28/06/23
 For Essel Energy Infra Pvt. Ltd.
 Auth. Signature

ESSEL ENERGY INFRA PVT. LTD.		Drawing Name - Pillion Hand Hold	
Model - SERF		Drawing No.- SERF-08	Date- 15-03-23
Revision Status: 00		Drawn By- DK Sharma	Approved By- SK Sharma

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

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TEST REPORT

Test Report No. :

C T O C S 1 2 8 2

Date: 26.06.2023

1.	Name & Address of Customer	M/s. ESSEL ENERGY INFRA PRIVATE LIMITED PLOT NO. 55, Sector -34, Gurgaon, Gurgaon, Haryana, 122001
2.	Customer's Reference	Docket No. 164977
3.	Description of Test Component	Stand fitted in two wheeled motor vehicles (ICAT-CTL/164977/01)
4.	Application on Vehicle Model	SERF
5.	Mass of vehicle in running order	98 kg
5.1	FAW	38 kg
5.2	RAW	60 kg
6.	Type of stand (Centre/Prop/both)	Prop Stand & Centre Stand
7.	Number of Stands	Prop Stand: 1 No. Centre Stand : 1 No.
8.	Material of the stands	Spring Material: RH Grade Stand Material: ERW1
9.	Wire Diameter	Prop Stand : 2.37 mm Centre Stand : 2.96 mm
10.	Free Length of Spring	Prop Stand : 105 mm Centre Stand : 120 mm
11.	Drawings showing the location and the construction	SERF-14
12.	Type of vehicle	2W (Vehicle Category : L1)
13.	Engine No. / Motor No. / Motor ID	BL-12-60-1200
14.	Chassis No.	MD9ESF0123C914001
15.	Test Objective	To carry out all the applicable tests on the test component as mentioned in Sr. No. 3 above as per AIS: 146-2018 upto Amend no. 2, November 2022
16.	Test Standard	AIS: 146-2018 upto Amendment no. 2, November 2022
17.	Date of Performance of Test	22.06.2023-25.06.2023
18.	Test Location	ICAT Centre I
19.	Test Results/Test Observations	For Test Results/Test Observations, please refer Annexure-I. Please refer Annexure-II for photograph of test setup used.
20.	Conclusion	The test component as fitted on the vehicle specified in Sr. No. 4 of this test report met all the applicable requirements when tested as per AIS: 146-2018 upto Amendment no. 2, November 2022

Prepared By	Checked & Authorized By	Approved By	
			
DEVYANI	HARISH JOSHI	AMIT KARWAL	
Asst. Manager	Manager	Deputy General Manager	Page 1 of 4 + Dwg. (01) [164977]




Test Report No. :

C T O C S 1 2 8 2

Date: 26.06.2023

Disclaimer

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11. 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.
12. The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.

Prepared By	Checked & Authorized By	 Page 2 of 4 + Dwg. (01) [164977]
		
DEVYANI Asst. Manager	HARISH JOSHI Manager	




Test Report No. : **C T O C S 1 2 8 2**

Date: 26.06.2023

Annexure- I

1.0 TEST REQUIREMENTS, RESULTS & OBSERVATIONS:

Clause No.	TEST REQUIREMENTS	TEST RESULTS / REMARKS
5.1	General Specifications;	
5.1.1	Vehicles of categories L1 and L2 shall be fitted with at least one stand.	Complied
5.1.1.1	Each stand fitted to the vehicle shall enable the vehicle to meet the performance requirements in 5.2 to 5.2.5.2 without being held or supported by a person or any other external means	Complied
5.1.1.2	Vehicles fitted with twinned wheels may not need to be fitted with a stand provided that the performance requirements in 5.3 to 5.3.2.5 and 5.3.4 to 5.3.4.3.4 are met.	Not applicable
5.1.1.3	Prop stands fitted to vehicles of category L1 with a mass in running order of less than 35 kg are exempted from the requirements in 5.2.3.3, to 5.2.3.4 and 5.2.5.2.	Not applicable
5.1.2	Vehicles of category L2 fitted with side car shall be fitted with at least one stand under the following conditions.	Not applicable
5.1.2.1	If the side-car is detachable from the motorcycle so that the motorcycle be used without it, the motorcycle shall fulfill the requirements for solo motorcycles in 5.1.1. to 5.1.1.2.	Not applicable
5.2	Specific Specifications;	
5.2.1	A stand shall be either a prop stand or centre stand.	Complied
5.2.2	Where the stand swivels below or about the lower part of the vehicle, its free end shall swing to the rear of the vehicle to reach the not-in-use position	Complied
5.2.5	Stand retention systems	
5.2.5.1	Stands shall be provided with a retention system which holds them in the not-in-use position	Complied
5.2.5.2	A retention system shall consist of:	
5.2.5.2.1	Two independent devices such as two separate springs or one spring and one other retaining device, or	Not applicable
5.2.5.2.2	A single device which shall be able to operate without failing for at least 10,000 normal-use cycles (i.e., travel between "not-in-use position" to "in-use-position") if the vehicle has been fitted with two stands; or 15,000 normal-use cycles (i.e., travel between "not-in-use position" to "in-use-position") if the vehicle is fitted with only one stand.	Complied

Prepared By	Checked & Authorized By	
		 Page 3 of 4 + Dwg. (01) [164977]
DEVYANI	HARISH JOSHI	
Asst. Manager	Manager	

Test Report No. :

C T 0 C S 1 2 8 2

Date: 26.06.2023



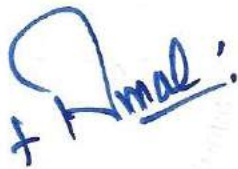
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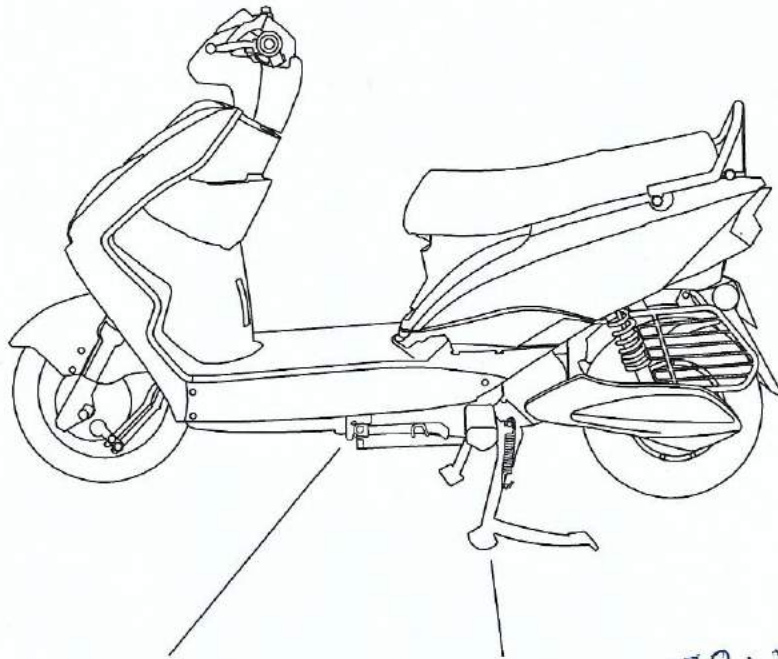
Annexure- II

Photograph of Vehicle under Test



Test Vehicle

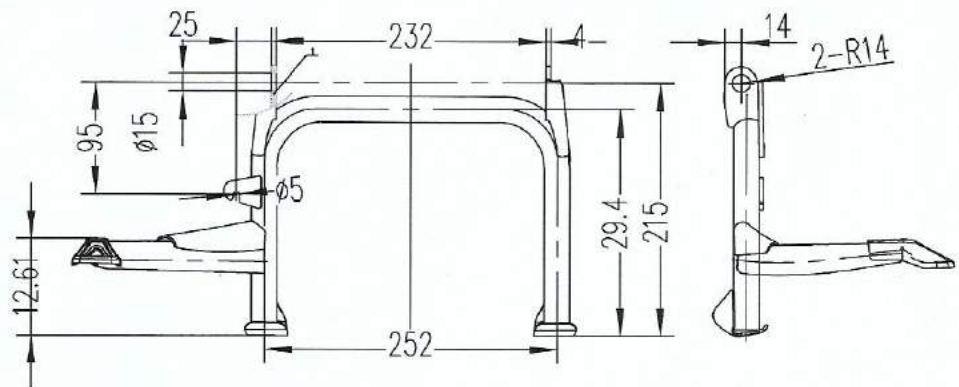
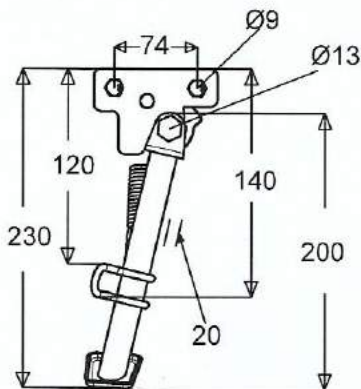
Prepared By	Checked & Authorized By	 Page 4 of 4 + Dwg. (01) [164977]
		
DEVVYANI Asst. Manager	HARISH JOSHI Manager	



TR No:- C10CS1282

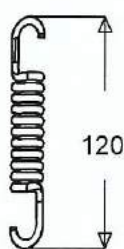
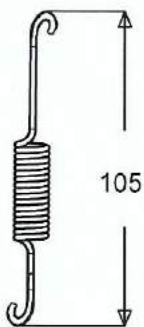
SIDE STAND

CENTRE STAND



SIDE STAND SPRING

CENTRE STAND SPRING



Retention mechanism for both stands:- One Spring
 Material of Spring:- RH Grade
 Material of Stand:- ERW1
 Wire Diameter Side Stand Spring:- 2.37mm
 Wire Diameter Centre Stand Spring:- 2.96mm

For Essel Energy Infra Pvt. Ltd.

Auth. Signatory

ESSEL ENERGY INFRA PVT. LTD.		Drawing Name - Brake Systems Layout	
Model - SERF		Drawing No.- SERF-14	Date- 15-03-23
Revision Status: 00		Drawn By- Pooran	Approved By- Yogesh Sharma

Non - Transferable




TEST REPORT



Test Report No. :

C T O C S 1 1 1 7

Date: 07.06.2023

1.	Name & Address of Customer	M/s. ESSEL ENERGY INFRA PRIVATE LIMITED PLOT NO. 55, Sector -34, Gurgaon, Gurgaon, Haryana, 122001
2.	Customer's Reference	Docket No. 164977
3.	Description of Test Component	Protective Device (Anti Theft Device) (ICAT-CTL/164977/01)
4.	Application on Vehicle Model	SERF
5.	Anti Theft Device manufacturing Plant address	M/s. SEECO INDUSTRIES C-8, SMA Industrial Estate, Delhi - 110033
6.	Part No.	SE-29122022
7.	Drawing No.	SE-29122022
8.	Type of Lock	TYPE-I
9.	Type of Tumblers	DISC
10.	Vehicle Category	L1
11.	Engine No. / Motor No. / Motor ID	BL-12-60-1200
12.	Chassis No.	MD9ESF0123C914001
13.	Test Objective	To carry out all the applicable tests on the test component as mentioned in Sr. No. 3 above as per AIS: 074-2005 with Amend no. 01, May 2015.
14.	Test Standard	AIS: 074-2005 with Amend no. 01, May 2015
15.	Test Location	ICAT Centre 1
16.	Date of Performance of Test	10.04.2023
17.	Test Results/Test Observations	For Test Results/Test Observations, please refer Annexure-I. Please refer Annexure-II for photograph of test setup used.
18.	Conclusion	The test component as fitted on the vehicle specified in Sr. No. 4 of this test report met the requirements when tested as per AIS: 074-2005 with Amend no. 01, May 2015.

Prepared By	Checked & Authorized By	Approved By
		
DEVYANI Asst. Manager	HARISH JOSHI Manager	AMIT KARWAL Deputy General Manager

Page
1 of 5
+
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[164977]


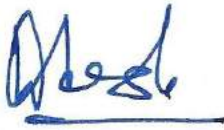

Test Report No. :

C T O C S 1 1 1 7

Date: 07.06.2023

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Prepared By	Checked & Authorized By	
		 Page 2 of 5 + Dwg. (02) [164977]
DEVYANI	HARISH JOSHI	
Asst. Manager	Manager	




Test Report No. : **C T O C S 1 1 1 7**

Date: 07.06.2023

Annexure- I

1.0 TEST REQUIREMENTS, RESULTS & OBSERVATIONS:

Clause No.	TEST REQUIREMENTS	TEST RESULTS / REMARKS
(A)	General Specifications :	
4.2	The protective device shall be so designed that:-	
4.2.1	It is necessary to put out of action in order to enable the vehicle to be steered or to be driven or moved forward in a straight line.	
4.2.3	It shall only be possible to extract the key with the bolt in the fully engaged or in the fully disengaged position. Any intermediate position of the key, which risks subsequent engagement of the bolt, even if the key of the protective device is inserted, shall be excluded.	Complied
4.3	The requirements of Sr. No. 4.2 shall be met by a single application of one key.	Complied
4.4	The protective device referred in 4.2 and the vehicle components on which it operates shall be so designed that it cannot rapidly & without attracting attention be opened, rendered ineffective or destroyed by, for example the use of low cost, easily concealed tools, equipments or fabrications readily available to the public at large.	Complied
4.5	The protective device shall be mounted on the vehicle as an item of original equipment (i.e. equipment installed by the vehicle manufacturer prior to first retail sale). The lock shall be securely assembled in protective devices (if the lock can be extracted using the key & after that cover or any other retention device has been removed, this is not in contradiction with the requirement)	Complied
4.6	The key locking system shall provide at least 1000 different key combinations or a number equal to the number of vehicles manufactured annually, if less than 1000. In vehicles of one type (i.e. models & variants) using the same device, the frequency of occurrence of each combination shall be roughly one per 1000.	1000 keyset declaration submitted by the customer.
4.7	The key & lock shall not be visibly coded.	Complied
4.8	The lock shall be so designed, constructed and fitted that turning of the lock cylinder when in the locked position with a torque of less than 2.45 Nm is not possible with anything other than the mating key, and;	Complied

Prepared By	Checked & Authorized By	
		 <p>Page 3 of 5 + Dwg. (02) [164977]</p>
DEVYANI	HARISH JOSHI	
Asst. Manager	Manager	


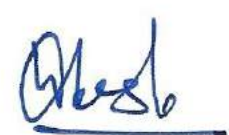

Test Report No. :

C T O C S 1117

Date: 07.06.2023

Annexure- I (Contd...)

Sr. No.	TEST REQUIREMENTS	TEST RESULTS / REMARKS
4.8.2	For lock cylinders with disc tumblers no more than two identical tumblers operating in the same direction shall be positioned adjacent to each other, and in a lock there shall not be more than 50% identical tumblers.	Total no. of tumblers in the lock : 06 Identical tumblers adjacent to each other (max) : 02 Identical tumblers in the lock (max.) : 02
4.9	Protective devices shall be such as exclude any risk, while the vehicle is in motion with engine running, of accidental blockage likely to compromise safety in particular.	Complied
4.10	The protective device shall in its activated position, be strong enough to withstand, without damaged to the steering mechanism likely to compromise safety, the application of a torque of 200 N-m about the axis of the steering shaft in both directions under static conditions.	The steering mechanism withstood the required torque. No damage observed to the steering mechanism.
4.11	The protective device shall be so designed that the steering can only be locked at an angle of at least 20° to the left and / or right of the straight ahead position.	Measured Angle: 33°
(B)	Particular specifications:	
5.1	In addition to the general specification prescribed in 'A' the protective device shall comply with the particular condition prescribed below:	Complied
5.1.1	It shall only be possible to engage the lock by means of a movement of the key, the handlebars being in the position appropriate for the engagement of the bolt in corresponding slot.	
5.2	It shall not be possible for a bolt to engage so long as the device is set in a position which permits the activation of the engine of the vehicle.	NA

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		 Page 4 of 5 + Dwg. (02) [164977]
DEVYANI	HARISH JOSHI	
Asst. Manager	Manager	

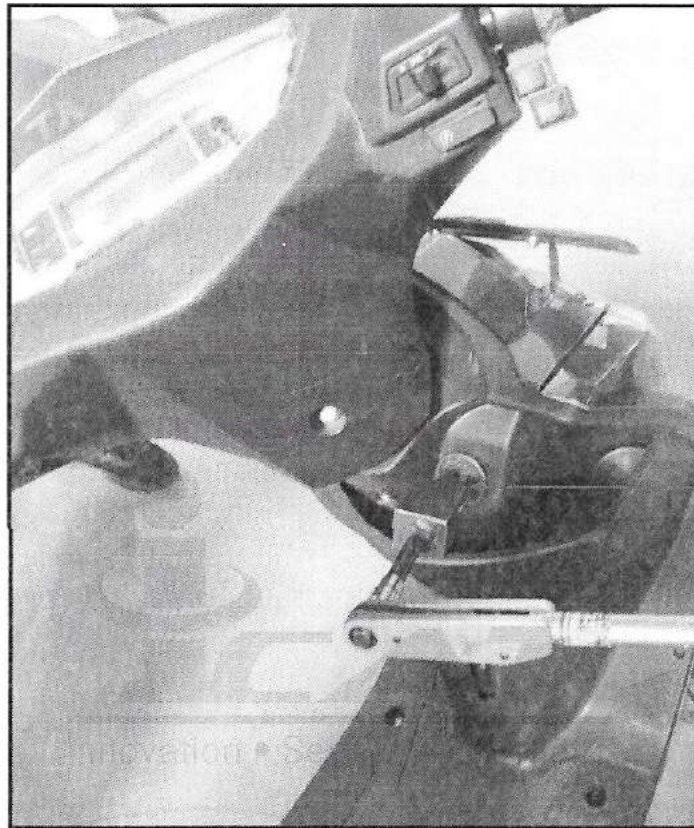
Test Report No. :

C T O C S 1117




Date: 07.06.2023

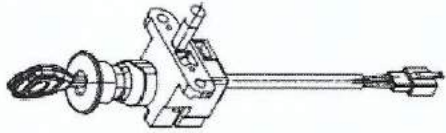
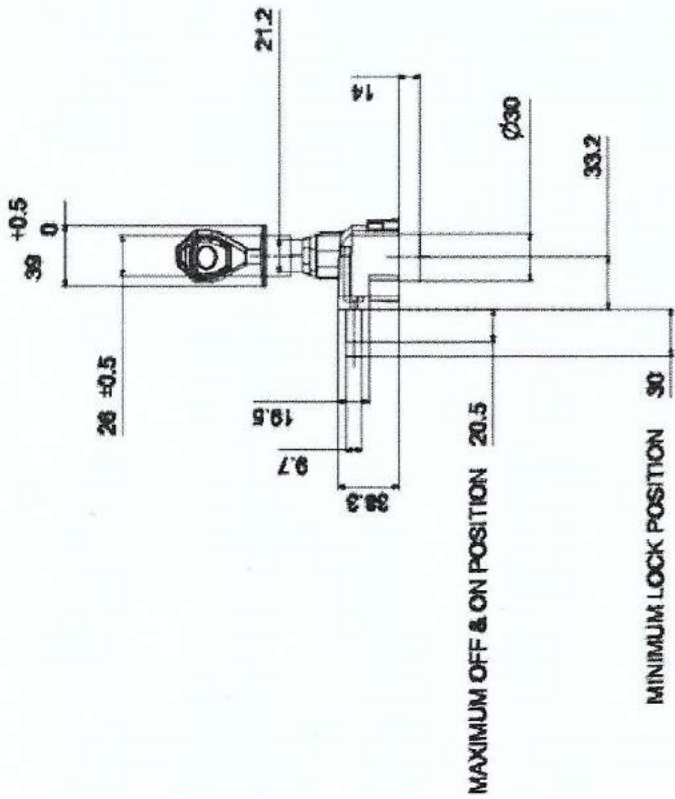
Annexure- II

Photograph of Vehicle under Test

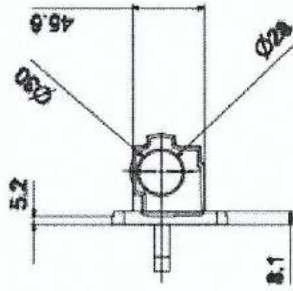
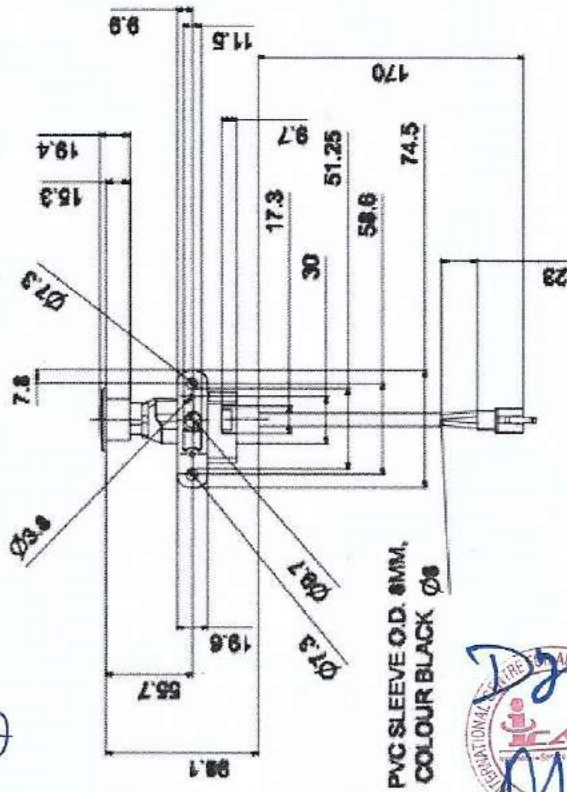


Steering Lock

Prepared By	Checked & Authorized By	 Page 5 of 5 + Dwg. (02) [164977]
		
DEVYANI Asst. Manager	HARISH JOSHI Manager	



TR No:- C70CS1117

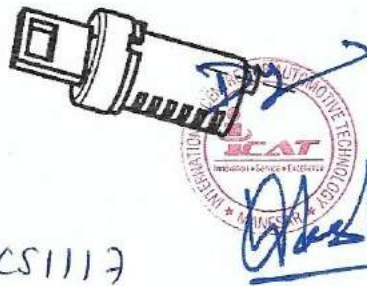
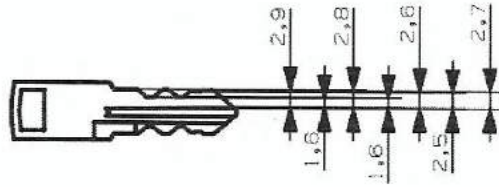
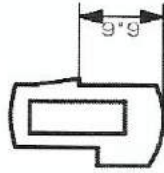
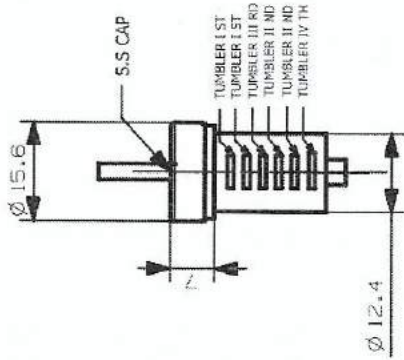
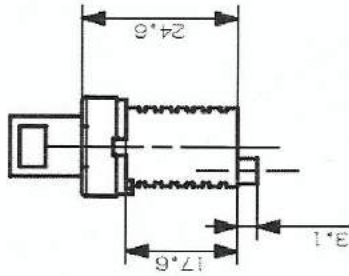


For SEECO INDUSTRIES

Proprietor
Gurpreet

DATE 14-03-2023

DESCRIPTION		WEIGHT	SERIAL No.	REWORK	HARDNESS
MATERIAL		CRCS.	PVS.		
IGNITION LOCK					
DRN	CHG	APPD	SCALE	DATE	
DESIGN	TECHNICAL	N/S	N/S	25/12/2022	
PROJECT No. SE-2912/2022					SHEET No. 01
AUTOMOTIVE PARTS					COKE



TRNO:- C10CS1117

For SEECO INDUSTRIES

Proprietor
Proprietor

DATE 14-03-2023

PART NO	SE-29122022	DATE
COMPANY NAME	SEECCO INDUSTRIES	29-12-2022

Non – Transferable






TEST REPORT

Test Report No. :

C T O C S 0 7 8 2

Date: 03.04.2023

1.	Name & Address of Customer	M/s. ESSEL ENERGY INFRA PRIVATE LIMITED PLOT NO. 55, Sector -34, Gurgaon, Gurgaon, Haryana, 122001
2.	Customer's Reference	Docket No. 164977
3.	Description of Test Component	Pillion Hand Hold as installed on the vehicle (With One-Piece Hand Grip) (ICAT-CTL/164977/01)
4.	Application on Vehicle Model	SERF
5.	PHH manufacturing plant address	M/s JSG INNOTECH PRIVATE LIMITED HSI IDC, Plot - 63, Sector 53, Phase V, Kundli, Sonipat, Haryana 131028
6.	Part No.	ESPHH1
7.	Drawing No.	SERF-08
8.	Material	MS
9.	Flange Bolt	M8X50 (3 Nos.)
10.	Engine No./Motor No./Motor ID	BL-12-60-1200/HC22110021
11.	Chassis No.	MD9ESF0123C914001
12.	Test Objective	To conduct the testing of Pillion Hand Hold for 2-Wheeled Vehicle & as installed on vehicle as per Standard: IS: 14495 – 1998 (Reaffirmed 2003).
13.	Test Standard	IS: 14495 – 1998 (Reaffirmed 2003).
14.	Date of Performance of Test	30.03.2023
15.	Test Results/Test Observations	For Test Results/Test Observations, please refer Annexure-I . Please refer Annexure-II for photograph of test setup used.
16.	Conclusion	The Pillion Hand Hold having One-Piece Hand grip specified in Sr. No. 3 of this test report, withstood without snapping a vertical traction force of 2000 N (200 kg) applied statically to the center of the surface of the Hand grip at a maximum pressure of 2 MPa when tested, and met the test requirements of Clause No. 2 & its sub clause 2.2 of IS: 14495 – 1998 (Reaffirmed 2003).


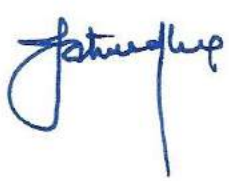

Prepared By	Checked & Authorized By	Approved By	
			
JATIN WADHWA	HARISH JOSHI	AMIT KARWAL	
Senior Engineer	Manager	Deputy General Manager	Page 1 of 4 + Dwg. (01) [164977]

Test Report No. : **C T O C S 0 7 8 2**

Date: **03.04.2023**

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11. 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.
12. The appropriate local court at Gurugram shall have the jurisdiction in respect of any dispute, claim or liability arising out of this report.

Prepared By	Checked & Authorized By	 <p>Page 2 of 4 + Dwg. (01) [164977]</p>
		
<p>JATIN WADHWA Senior Engineer</p>	<p>HARISH JOSHI Manager</p>	




Test Report No. : **C T O C S 0 7 8 2**

Date: 03.04.2023

Annexure-I

1.0 TEST REQUIREMENTS, OBSERVATIONS & RESULTS:

Sr. No.	TESTS & CL. NO.	REQUIREMENTS	RESULTS
1.	General Requirements (Cl. No.2)	Where provision is made for carriage of pillion, the vehicle shall be fitted with pillion hand-holds system, in the form of a strap or a hand grip(s). The pillion hand holds system shall be so fitted that it is convenient for the pillion rider to make use of it in his normal sitting position, irrespective of whether he is sitting side or cross saddled.	Hand Grip (Complied)
2.	Testing of Hand Grip (Cl. No. 2.2) {If one hand grip} →	The hand grip shall be designed in such a way that it is able to withstand, without snapping, a vertical traction force of 2000 N (200 kg) applied statically to the centre of the surface of hand-grip at a maximum pressure of 2 MPa.	Complied
	{If two hand grips} →	If two hand-grips are used, these shall be fitted one on each side is able to withstand without snapping a vertical traction forces of 1000 N (100 kg) applied statically to the centers of the surface of individual hand-grips at a maximum pressure of 1 MPa.	NA

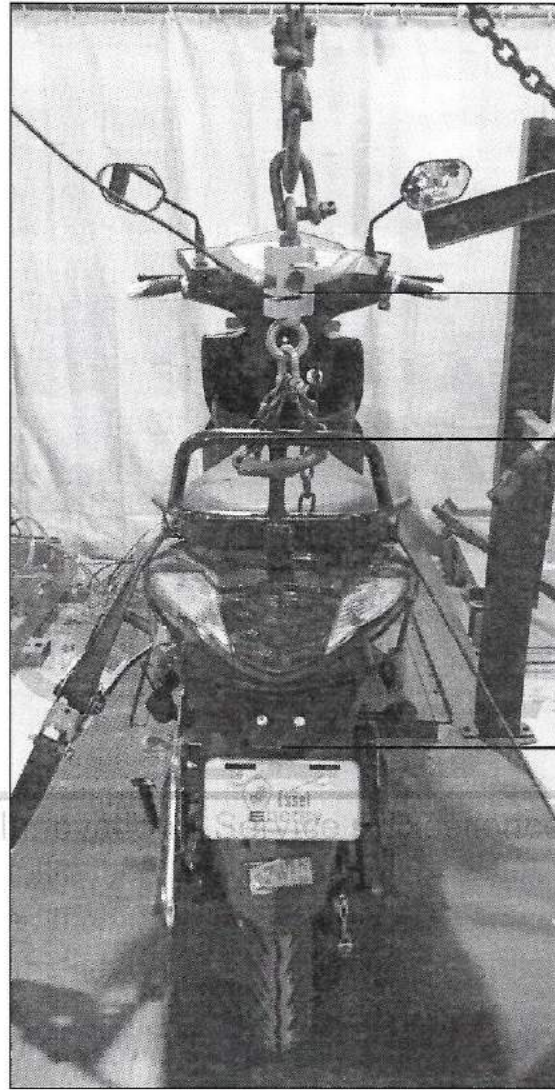
Prepared By	Checked & Authorized By	 <p>INTERNATIONAL CENTRE FOR AUTOMOTIVE TECHNOLOGY Innovation • Service • Excellence MANESAR • AUTOMOTIVE</p> <p>Page 3 of 4 + Dwg. (01) [164977]</p>
		
JATIN WADHWA Senior Engineer	HARISH JOSHI Manager	

Test Report No. : **C T O C S 0 7 8 2**

Date: **03.04.2023**

Annexure-II


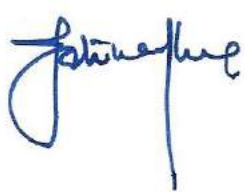

Vehicle Model: SERF

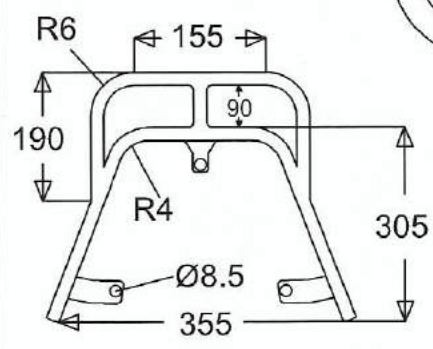
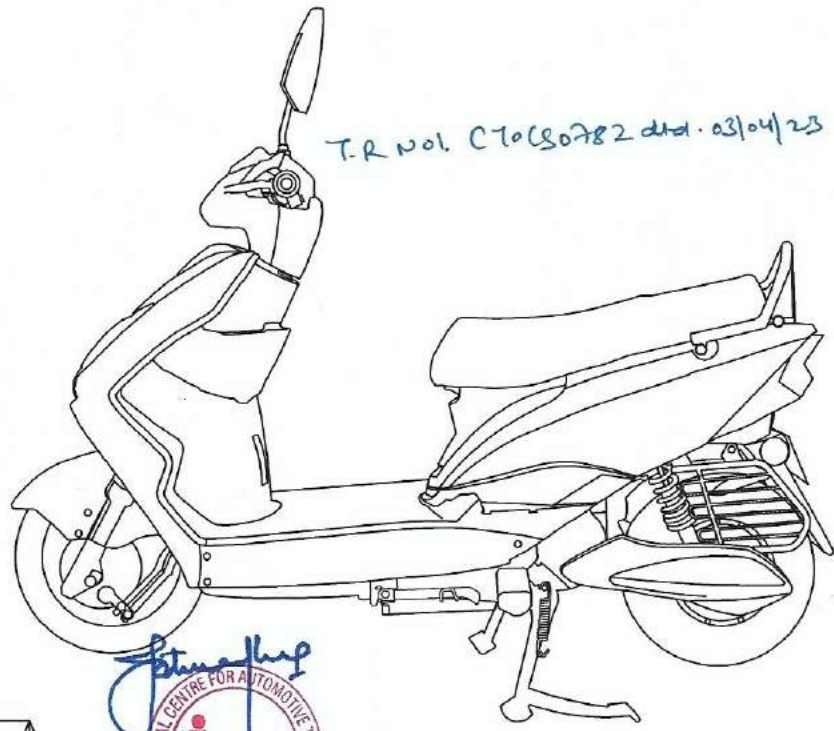


→ Load Cell

→ Pillion Hand Hold

→ Test Vehicle

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JATIN WADHWA Senior Engineer	HARISH JOSHI Manager	



Part Name - Pillion Hand Hold
 Part no.- ESPHH1
 Material- MS
 Mounting- MS 10.8 Grade Bolt
 Hex Head M8 x 50 mm
 3 Mounting by MS
 Hex Bolt M8x50mm

For Essel Energy Infra Pvt. Ltd.
 Auth. Signature

ESSEL ENERGY INFRA PVT. LTD.		Drawing Name - Pillion Hand Hold	
Model - SERF		Drawing No.- SERF-08	Date- 15-03-23
Revision Status: 00		Drawn By- DK Sharma	Approved By- SK Sharma