



WALMART HARMONIZED PROTOCOL TESTING FOR ON SPEC LLC.

Tested Sample(s)	: Electronic Bicycle
Brand	: SWFT
Model	: SWFT-FLEET-XXX (XXX can be letter A to Z indicate appearance color)
Color	: White
Size	: 26"
Stock / Model Number	: Not Specified
Country of Origin	: China
Age Grading	: Not Specified
Children's Product	: No

Prepared For:

On Spec LLC.
137 Grand Street 3rd Fl,
New York, NY 10013



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Final Report: 1537.07050.R1

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CONCLUSION

1537.07050 – On Spec, SWFT-FLEET-XXX (White)		
Purpose of Test - Each test performed is intended to check compliance with the following:	Result	Comment
CPSC 16 CFR 1512 – Requirements for Bicycles	C	
Determination of Total Lead Content in Surface Coating Associated with California Proposition 65 – Hazardous Drinking Water Act	C	Per ACT test report 1537.06584.001
Determination of Total Cadmium Content in Surface Coating Associated with California Proposition 65 – Hazardous Drinking Water Act	C	
Determination of Total Lead Content in Substrate Associated with California Proposition 65 – Hazardous Drinking Water Act	*	
US State Regulations for Phthalates per California Proposition 65 Chapter 6.6. Safe Drinking Water and Toxic Enforcement Act of 1986	*	
Bisphenol-A Content	*	
Toxics in Packaging Coalition Northeastern Governors (CONEG) Toxics in Packaging Clearinghouse (TPCH) rules for Heavy Metals in Packaging	C	
ANSI/CAN/UL/ULC 2271:2018 Batteries for Use In Light Electric Vehicle (LEV) Applications	C	
ANSI/CAN/UL 2849: 2020 Standard for Safety Electrical Systems for e-Bikes	C	
FCC Part 15, Subpart B	C	Per CTI test report EED39N806584
10 CFR 430.32 Energy and water conservation standards and their compliance dates.(z) Battery Chargers	C	Per CTI test report EED35N806585



WALMART Harmonized Test Protocol for All Products	C	
WALMART Harmonized Test Protocol for Batteries	C	
WALMART Harmonized Test Protocol for Battery Operated Products	C	
WALMART Harmonized Test Protocol for Bicycles, Electric Bicycle and Bicycle Accessories	C	
Walmart Labeling, Instructions, Claim Verification, Tracking label, and Country of Origin	C	

President,

John A. Bogler

SAMPLE IDENTIFICATION

Brand:	SWFT	Job No.:	1537.07050
Model:	SWFT-FLEET-XXX	Sample ID:	1537.07050.001
Manufacturer:	Eurosun	Type:	Electronic Bicycle
Model No.:	Not Specified	Material:	Not Specified
Stock No.:	Not Specified	Size:	26"
UPC:	Not Specified	Color(s):	White
Serial No.:	Not Specified	Weight (kg):	23.7
Serial No.:	Not Specified	Country of Origin:	China



1537.07050.001 – SWFT-FLEET-XXX (White)



YS-728



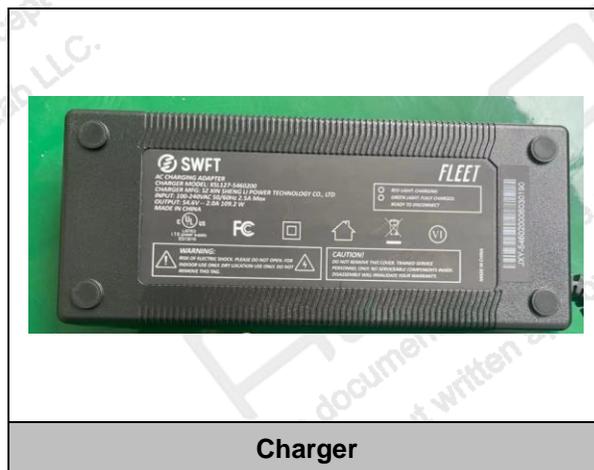
YS-721-3

Battery:			
Brand/ Type:	SINC	Normal Voltage:	46.8V
Model:	SINC46810	Rated Capacity:	10Ah



Battery

Charger:			
Brand:	XVE	Input:	100-240VAC
Model:	XSL127-5460200	Output:	54.6V



Charger

Drive Unit (Motor):			
Brand/Type:	XD	Reted Continuous Output:	500W
Model:	48V26"500W	Rated Voltage:	48V



Motor

Controller:			
Brand:	FHS	Serial #:	--
Model:	PRJ-R-005-02-A0	Bike type:	Electronic Bicycle



Controller

DATE AND PLACE OF TEST

Sample(s) received on : 20 April 2021
Testing was initiated on : 11 May 2021
Testing was completed on : 29 July 2021
Testing was performed at : Taicang ACT Sporting Goods Testing Co., Ltd.
Taicang City, Suzhou, Jiangsu Province, China
STQ
2-1-B, China-singapore science industrial zone I, 8# zhanye
road, sip Suzhou, China

TEST METHODS

Method for each test conducted is as follows:

- Walmart Harmonized Protocol for All Products was performed according to the specified Walmart Harmonized Protocol and all standards referenced within.
- Walmart Harmonized Protocol for Batteries was performed according to the specified Walmart Harmonized Protocol and all standards referenced within.
- Walmart Harmonized Protocol for Battery Operated Products was performed according to the specified Walmart Harmonized Protocol and all standards referenced within.
- Walmart Harmonized Protocol for Bicycles, Electric Bicycle and Bicycle Accessories was performed according to the specified Walmart Harmonized Protocol and all standards referenced within.
- Walmart Labeling, Instructions, Claim Verification, Tracking label, and Country of Origin
- CPSC 16 CFR 1512 test was performed according to the CPSC Bicycle Compliance Test Manual (1976) Requirements for Bicycles standard and all other standards referenced within.
- UL2271 testing was performed utilizing the test methods from the ANSI/CAN/UL/ULC 2271: 2018 Batteries for Use In Light Electric Vehicle (LEV) Applications.
- UL2849 testing was performed utilizing the test methods from the ANSI/CAN/UL 2849: 2020 Standard for Safety Electrical Systems for e-Bikes.

TEST RESULTS

C: Compliant; Product meets specified standard
NC: Non-Compliant; Product does not meet specified standard
NA: Not Applicable to this design
NR: Not Requested by the Applicant
NP: Not Present

ND: None Detected
IC: Inconclusive
NT: Not Tested
FTR: Further Testing Recommended
PPM: Parts Per Million
***:** See Comments



CPSC & ASTM F963 (Annex A1): AGE GRADING

CPSC & ASTM F963 GUIDELINES / Walmart All Products		
<u>Age Grading</u>	<u>Test Result</u>	<u>Observation and Notes</u>
-	NA	-

CLAIM VERIFICATION

CLAIM VERIFICATION / Walmart All Products		
<u>Claim</u>	<u>Test Result</u>	<u>Observation and Notes</u>
-	NA	-

LABELING: TRACKING LABEL, COUNTRY OF ORIGIN, INSTRUCTIONS

LABELING / Walmart All Products				
<u>Label Location</u>	<u>Description</u>	<u>Reference</u>	<u>Type</u>	<u>Result</u>
On product	Warning	-	Sticker	C
On product	Country of Origin	China	Sticker	C
Inside of Carton	Manual	-	Printed	C



CPSC 16 CFR 1512: BICYCLE TEST

CPSC 16 CFR 1512			
Ref. #	Test Description	Result	Observations and Notes
1512.2	DEFINITIONS		
2(a)(2)	Bicycle means: less than 750 watts, less than 20 mph (Yes or No)	Yes	
1512.4	MECHANICAL REQUIREMENTS		
4(a)	Assembly	C	
4(b)	Sharp Edges	C	
4(c)	Integrity – 1512.18 (d), (e), (p), (q)	C	
4(d)	Attachment Hardware	C	
4(e)	“Reserved” – Protrusion Test	NA	
4(f)	“Reserved”	NA	
4(g)	Excluded Area	C	
4(h)	“Reserved” – Screw Length	NA	
4(i)	Control Cable Ends – 1512.18 €	C	
4(j)	Control Cable Abrasions	C	
1512.5	REQUIREMENTS FOR BRAKING SYSTEM		
5(a)	Braking System	C	
5(b)	Handbrakes – 1512.18 (d)(2)(i), (iii)	C	
5(b)(1)	Stopping Distance – 1512.18 (d)(2)(v)	C	
5(b)(2)	Hand Lever Access	C	
5(b)(3)	Grip Dimension	C	
5(b)(4)	Attachment - 1512.18 (d)(2)(iii)	C	
5(b)(5)	Operating Force	C	
5(b)(6)	Pad and Pad Holders – 1512.18 (d)(2)(iii)	C	
5(b)(7)	“Reserved”	NA	
5(b)(8)	Hand Lever Location	C	
5(b)(9)	Hand Lever Extensions	NA	
5(c)	Footbrakes – 1512.18 €(2)	NA	
5(c)(1)	Stopping Distance – 1512.18 €(3)	NA	
5(c)(2)	Operating Force	NA	
5(c)(3)	Crank Differential	NA	
5(c)(4)	Independent Operation	NA	
5(d)	Footbrakes and Handbrakes – 1512.5 €	NA	
5(e)(1)	Sidewalk Bicycles shall not have handbrakes only	NA	
5(e)(2)	Sidewalk Bicycles seat height > 560 mm - 1512.5 €, 1512.18 (f)	NA	



CPSC 16 CFR 1512			
Ref. #	Test Description	Result	Observations and Notes
5(e)(3)	Sidewalk Bicycles seat height < 560 mm – 1512.18 (f)	NA	
1512.6	REQUIREMENTS FOR STEERING SYSTEM		
6(a)	Handlebar Stem Insertion Mark	C	
6(b)	Handlebar Stem Strength – 1512.18 (g)	C	
6(c)	Handlebar	C	
6(d)	Handlebar Ends – 1512.18 €	C	
6(e)	Handlebar and Clamps – 1512.18 (h)(1), (h)(2),1512.19(a)(2)	C	
1512.7	REQUIREMENTS FOR PEDALS		
7(a)	Construction	C	
7(b)	Toe Clips	NA	
7(c)	Pedal Reflectors – 1512.16 €	C	
1512.8	REQUIREMENTS FOR DRIVE CHAIN		
1512.9	REQUIREMENTS FOR PROTECTIVE GUARDS		
9(a)	Chain Guard	C	
9(b)	Derailleur Guard	NA	
1512.10	REQUIREMENT FOR TIRES		
1512.11	REQUIREMENTS FOR WHEELS		
11(a)	Spokes	C	
11(b)	Alignment	C	
11(c)	Rims – 1512.18(j)	C	
1512.12	REQUIREMENTS FOR WHEEL HUBS		
12(a)	Locking Devices	C	
12(a)(1)	Rear Wheels	C	
12(a)(2)	Front Wheels	C	
12(b)	Quick-Release Devices	NA	
12(c)	Front Hubs – 1512.18 (j)(3)	C	
1512.13	REQUIREMENTS FOR FRONT FORK – 1512.18 (k)(1)		
1512.14	REQUIREMENTS FOR FORK AND FRAME ASSEMBLY – 1512.18(k)(2)		
1512.15	REQUIREMENTS FOR SEAT		
15(a)	Seat Limitation	C	
15(b)	Seat Post	C	
15(c)	Adjustment Clamps – 1512.18 (l)	C	
1512.16	REQUIREMENTS FOR REFLECTORS		
16(a)	Front, Rear, and Pedal Reflectors	C	



CPSC 16 CFR 1512

Ref. #	Test Description	Result	Observations and Notes
16(b)	Side Reflectors	C	
16(c)	Front Reflectors – 1512.18 (m)	C	
16(d)	Rear Reflectors – 1512.18 (m)	C	
16(e)	Pedal Reflectors	C	
16(f)	Side Reflectors	C	
16(g)	Reflector Tests – 1512.18 (n)	C	
16(h)	Retro-reflective Tire Sidewalls – 1512.18 (o), €	NA	
16(i)	Retro-reflective Rims – 1512.18 (o)	NA	
1512.17	OTHER REQUIREMENTS		
17(a)	Road Test – 1512.18 (p)	C	
17(b)	Sidewalk Bicycle Proof Test	NA	
17(c)	Ground Clearance	C	
17(d)	Toe Clearance	C	
1512.19	INSTRUCTIONS AND LABELING		
19(a)(1)	Operation and Safety Instructions	C	
19(a)(2)	Assembly Instructions	C	
19(a)(3)	Maintenance Instructions	C	
19(b)(1)	List of Tools for Assembly	C	
19(b)(2)	Illustration of Minimum Leg Length	C	
19(c)	The Minimum Leg Length Dimension	C	
19(d)	“Reserved” – Label for 1976-1978	NA	
19(e)	Permanent Label – Manufacturer’s Information	C	



ANSI/CAN/UL/ULC 2271: 2018 Batteries for Use In Light Electric Vehicle (LEV) Applications

ANSI/CAN/UL/ULC 2271:2018 Batteries for Use in Light Electric Vehicle (LEV) Applications			
Ref. #	Test Description	Result	Observations and Notes
CONSTRUCTION			
7	Non-Metallic Materials		
7.1	Enclosure Materials Comply with UL746C, Path III of Enclosure Requirements in Table 4.1 (or CAN/CSA-C22.2 No. 0.17)	C	
7.2	Polymeric Materials – Minimum Flame Rating of 94V-1 (UL 94 or CAN/CSA-C22.2 No. 017)	C	
7.3	Resistance to impact, crush resistance, abnormal operations, sever conditions, mold-stress relief distortion	C	
7.4	Polymeric Materials – Enclosure w/ Insulation shall have Relative Thermal Index $\geq 80^{\circ}\text{C}$ (176°F) (UL 746B or CAN/CSA-C22.2 No. 017)	C	
7.5	Enclosure Materials Exposed to Sun/Rain Meet UV Resistance and Water Exposure/Immersion Tests (UL 746C or CAN/CSA-C22.2 No. 017)	C	
7.6	Electrical Insulation shall be resistant to deterioration	C	
7.7	Gaskets and Seals Relied Upon for Safety Meet Environmental Requirements.	C	
8	Metallic Parts Resistance to Corrosion		
8.1	Metal Enclosures – Corrosion Resistant (UL 50E or CAN/CSA-C22.2 No. 94.2)	C	
8.2	Insulation of Metal Enclosures – Non-Moisture Absorbent Materials w/ Suitable Temperature Rating.	NA	
8.3	Conductive parts at terminals and connections shall not be subject to corrosion due to electrochemical action.	C	
9	Enclosures		
9.1	Enclosure Strength and Rigidity	C	
9.2	Minimum Tool Requirement for Access to Enclosure (pliers, screwdriver, wrench...)	C	
9.3	Inadvertent Access to Hazardous Parts/Situations	C	
9.4	Openings in the enclosure shall be designed to prevent ingress of water (IPX3)	C	
10	Wiring and Terminals		
10.1	Wiring shall be insulated properly		
10.2	Internal Wiring Strain Relief – no loosening of connections or damage of insulation	C	
10.3	Connections to Cell Terminals	C	
10.4	External Terminals – designed to prevent inadvertent shorting, misalignment, or disconnection when scooter is in use	C	
10.5	External Terminals for Charging – designed to prevent inadvertent shorting, misalignment, or disconnection when DUT is in use	C	
10.6	Removable Batteries/Terminals for Charging – designed to prevent inadvertent shorting, misalignment, or disconnection when DUT is in use	C	
10.7	External Terminals/Removable Battery Packs – Endurance Test (UL 2251)	C	
10.8	Holes for Wiring – smooth surface, free of burrs, fins, sharp edges, etc..	C	
10.9	Hazardous Voltage Warning Label (ISO 7010, No. W012 – i.e. lightning bolt within triangle)	NA	
11	Fuses		
11.1	Fuses shall be acceptable for the current and voltage of the circuit they protect.	C	
11.2	Replaceable Fuses – Replacement properly/obviously marked adjacent to holder	NA	



ANSI/CAN/UL/ULC 2271:2018 Batteries for Use in Light Electric Vehicle (LEV) Applications			
Ref. #	Test Description	Result	Observations and Notes
12	Handles	NA	
13	Electrical Spacings and Separation of Circuits		
13.1	Circuits w/ reverse polarity shall have enough spacing (or insulated properly) to prevent inadvertent shorting.	C	
13.2	Electrical Spacings – Minimum over surface and through air spacing from Table 13.1	C	
13.3	Exemptions for Minimum Insulation	NA	
13.4	Conductors of Circuits operating at different voltages shall be reliably separated (space or insulation)	C	
14	Insulation Levels and Protective Grounding		
14.1	Hazardous Voltage Circuits – Insulated from accessible conduction parts and safety extra low voltage circuits (60 Vdc or 48 Vrms)	NA	
14.4	Protective Ground System – Max Resistance of 0.1 Ω	NA	
14.5	Ground Terminal Identification	NA	
14.6	Conductor shall be properly sized – shall be green or green & yellow striped in color	NA	
15	Protective Circuits and Safety Analysis		
15.1	Protective Circuit shall maintain cells within their normal operating region for charging/discharging	C	
15.2	Analysis of potential electrical and energy hazards (FMEA)	C	
15.4	Critical Safety Circuits – provided with redundant passive protection,	C	
15.5	Electronic and Software Protection Scheme (UL 991, UL 60730-1, IEC 61508-1)	C	
15.6	EESA Containing Hazardous Voltages – Manual Disconnect	NA	
15.7	Manual Disconnect Requirements (no auto reset, disconnects both poles, capable of full load disconnects, and no hazardous conditions upon automatic actuation)	NA	
16	Cells and Electrochemical Capacitors		
16.2	Lithium based Cells – comply w/ UL 2580 (or ULC-S2580)	C	
16.3	Nickel Based Cells – comply w/ UL 2580 (or ULC-S2580)	NA	
16.4	Sodium nickel metal chloride Based Cells – comply w/ UL 1973	NA	
16.5	Valve regulated lead acid batteries shall comply with pressure release test from UL 1989	NA	
16.6	Electrochemical capacitors shall comply with the capacitor requirements in UL 810A	C	
17	Manufacturing and Production Line Testing		
17.1	All Batteries shall be subjected to 100% production screening to determine acceptable spacing, insulation, and grounding system production	NA	
17.2	Dielectric Withstand Test (Section 29)	NA	
17.3	Continuity Check of grounding conductors	NA	
17.4	Documented Production Process Controls	NA	
18	PERFORMANCE		
18.1	Batteries shall be fully charged. After charging and prior to testing all batteries shall rest for a maximum period 8 hours at 25±5°C (77±9°F)	C	
18.2	Use of fresh samples	C	
18.3	Ambient Room Conditions 25±5°C (77±9°F)	C	
18.4	Thermocouple requirements for measuring temperature	C	



ANSI/CAN/UL/ULC 2271:2018 Batteries for Use in Light Electric Vehicle (LEV) Applications			
Ref. #	Test Description	Result	Observations and Notes
18.5	Protective Circuits and Faults	C	
18.6	WARNING: Risk of explosion, fire, and emission of flammable and/or toxic fumes. Take necessary precautions, use proper safety equipment/protocols, well ventilated, climate controlled area	C	
18.7	All test methods shall be followed by a minimum 1 hour observation time before next test.	C	
19	COMBUSTIBLE CONCENTRATIONS		
19.1	Cells shall not vent off gas when tested to method in 19.2	NA	
21	POST TEST CYCLE		
21.1	Operational units still functional after testing to sections 23, 24, 25, 27, 30, 31, 33, 36, 39, and 40	C	STQ Test Report SZ2021051086-5
	ELECTRICAL TESTS		
23	Overcharge Test	C	
24	Short Circuit Test	C	STQ Test Report SZ2021051086-5
25	Over-discharge Test	C	
26	Temperature Test	C	
27	Imbalanced Charging Test	C	
28	Dielectric Voltage Withstand Test	NA	STQ Test Report SZ2021051086-5
29	Isolation Resistance Test	NA	STQ Test Report SZ2021051086-5
	MECHANICAL TESTS		
30	Vibration Test	C	STQ Test Report SZ2021060590E
31	Shock Test	C	STQ Test Report SZ2021060590E
32	Crush Test	NA	STQ Test Report SZ2021051086-5
33	Drop Test	C	
34	Mold Stress Relief Test	C	
35	Handle Loading Test	NA	STQ Test Report SZ2021051086-5
36	Roll Over Test	NA	STQ Test Report SZ2021051086-5
37	Strain Relief Test (Cord Anchorages)		
37.2	Strain Relief Pull Test	C	
37.3	Push-Back Test	C	
38	Immersion Test	C	STQ Test Report SZ2021051086-5
39	Water Exposure Test (IP Code Rating)	C	STQ Test Report SZ2021051086-5
40	Thermal Cycling Test	C	STQ Test Report SZ2021051086-5
41	Label Permanence Test	C	
	MARKINGS		



ANSI/CAN/UL/ULC 2271:2018 Batteries for Use in Light Electric Vehicle (LEV) Applications			
Ref. #	Test Description	Result	Observations and Notes
42.1	Legible and Permanent Markings (adhesive-backed labels must comply w/ UL 969)	C	
42.2	Marked with Manufacturer's Name, Trade Name, Trademark, or other descriptive marking which may identify the organization responsible for the product, Part or Model #, Electric Ratings (Vdc and Ah or Wh), and chemistry	C	
42.3	External Terminal and Connections – Proper ID and Polarity Markings “positive” or “+” and “negative” or “-“	C	
42.4	Date of Manufacture or Traceable Date Code (does not repeat within 10 years)	C	
42.5	Charging Instructions (“Use Only () Charger”)	C	
42.6	All external terminals and connections shall be provided with proper ID and if applicable, polarity markings.	C	
42.7	Ground Connection Markings	NA	
42.8	Warning for Hazardous Voltage Circuits	NA	
42.9	Warning about reading instruction manual.	C	
42.10	Marks for IPX3 rating not required. Scooters marked w/ higher IP ratings shall comply with those ratings.	NA	
INSTRUCTIONS			
43	Shall Include:		
43.1	Complete Instructions for installation and Integration of EESA in the end use vehicle to prevent movement and stress on connections and parts.	C	
Instructions for proper use of EESA including:			
43.2	Installation	C	
	Charing and Discharging	C	
	Storage and Disposal	C	
	Temperature Limits	C	
	Charging and Discharging Limits	C	
	Instructions for replacement of user replaceable fuses.	NA	
43.3	EESA not intended for removal from vehicle and require specific charger require special marking	NA	
43.4	EESA intended for removal and charging outside of vehicle shall have safe-handling instructions for removal/insertion/storage of charged batteries.	C	
43.5	Region Specific Instructions for US and Canada	C	



ANSI/CAN/UL/ULC 2849: 2020 Standard for Safety Electrical Systems for e-Bikes

ANSI/CAN/UL/ULC 2849: 2020 Standard for Safety Electrical Systems for e-Bikes			
Ref. #	Test Description	Result	Observations and Notes
CONSTRUCTION			
7	General		
7.3	For any system – bike incorporates functioning pedals. For EPAC systems – motor disengages when rider stops pedaling, when max speed is reached, or when user applies brake.	C	
7.4	The electrical systems comply with all requirements at a max altitude of 2,000 m, between ambient temperature range of 0 to 40 ° C and are subjected to Ingress Protection Test (Section 36). Equipment can be used at temperature extremes for operation and battery charging. (e.g. -10 ° C or +50 ° C).	C	
POWER LEVELS EVALUATION			
8.2	Dangerous Voltage and Energy		
8.3	Low Voltage Limited Energy Circuits		
8.3.1	Low voltage low energy circuits conform to limits given in Table 8.1	C	
8.3.2	Customer provides one of the following as their power limitation configuration:		
	A) An inherently limited transformer.	NA	
	B) A non-inherently limited transformer coupled with an overcurrent protective device in the output circuit.	C	
	C) A combination transformer and fixed impedance.	NA	
	D) An arrangement determined to be equivalent to A), B), or C)	NA	
8.3.6	Overcurrent protection devices are rated to or set to a value less than that specified in Table 8.1 and does not have an automatic reset.	C	
8.3.7	LVLE current limitation in Table 8.1 is not affected by a malfunction of a regulating network. The network complies with Table 8.1 when current is measured after 5 seconds.	C	
PROTECTION WHILE CHARGING			
10.1	General		
10.1.1	If battery is only intended to be charged when removed from the bike, there is a mean to prevent the user from charging the battery while on the eBike.	C	
10.2	Charging Batteries On the eBike		
10.2.6	The eBike has either a charger connect-interlock or some secondary means to prevent inadvertent motor activation.	C	
BATTERY PACKS			
11.1	Battery pack providing power to the motor is equipped with the appropriate Battery Management System (BMS) and able to withstand normal misuse. Customer provides compliance with one of the following safety standards:		
	A) UL 2580	NA	
	B) UL 2271	C	



ANSI/CAN/UL/ULC 2849: 2020 Standard for Safety Electrical Systems for e-Bikes				
Ref. #	Test Description	Result	Observations and Notes	
	C) UL 62133	NA		
	D) UL 2054	NA		
11.3	Customer provides compliance with one of the following standards for their rechargeable batteries providing power to electrical parts, other than the motor:			
	A) UL 62133	NA		
	B) UL 2054	NA		
SAFETY CIRCUITS AND SAFETY ANALYSIS				
12.4	Customer provides a risk analysis assessment for potential hazards (e.g. protective circuits) addressing all hazardous events and is guided by one of the following:			
	A) IEC 60812	NA		
	B) IEC 61025	NA		
	C) SAE J1739	NA		
	D) MIL-STD-1629A	NA		
	E) Other equivalent standard	C		
12.5	Risk analysis incorporates all anticipated faults and failures that can occur.	NA		
12.7	Customer provides appropriate safety criteria for the functionality and reliability of safety devices as shown below:			
	A) UL 991, UL 1998 and CSA C22.2 No. 0.8	NA		
	B) UL 60730-1 and CSA C22.2 E 60730-1	NA		
	C) IEC 61508	NA		
	D) ISO 13849-1 and ISO 13849-2	C		
	E) Other equivalent standard	NA		
ENCLOSING AND INSULATING HAZARDOUS PARTS				
13.4	Sharp Edges			
13.4.1	The eBike battery enclosure does not have sharp edges that can cause harm to a person throughout normal maintenance and use.	C		
FLAMMABILITY				
17.2	Nonmetallic materials used for internal parts within the overall enclosure have a V-2 minimum rating.	C		
17.7	The flammability rating of the material is provided as part of the material rating or the flammability rating is determined by compliance with UL 94 and CAN/CSA C22.2 No. 0.17 provided by customer.	C		
INTERNAL WIRING AND TERMINALS				
18.1	Wiring insulation is acceptable for all its anticipated conditions throughout use.	C		
18.2	All internal wiring is secured properly to reduce excessive strain on wires and terminal connections, prevent loosening of terminal connections, and protect from damage to conductor insulation. All conductors are properly positioned within safety circuits so that reliance is not placed fully on the soldering alone.	C		
18.3	External terminals are designed to prevent inadvertent shorting, misalignment, and disconnection.	C		



ANSI/CAN/UL/ULC 2849: 2020 Standard for Safety Electrical Systems for e-Bikes			
Ref. #	Test Description	Result	Observations and Notes
18.4	External terminals for charging are designed to prevent inadvertent shorting, misalignment, and a reverse polarity connection when connected to charger.	C	
18.6	No sharp edges, burrs, or fins are present in any metal holes where wires pass through.	C	
OVERCURRENT PROTECTION			
19.1	All power, control, and auxiliary circuits have overcurrent protection properly sized to prevent overheating of the smallest size conductor.	C	
19.2	Results received from Subcontractor's Locked Rotor Tests and Running Overload Tests do not identify any additional need for overcurrent protection devices.	C	
19.3	Technician interpretation proves overcurrent devices are located at the shortest distance possible from the power supply/battery.	C	
19.4	If overcurrent protection is needed for the LVLE circuits (<i>determined in Section 8</i>), customer provides this through fuses, circuit breakers, or a positive temperature coefficient device.	C	
19.6	The fuse or circuit breaker being used is either type:		
	A. Acceptable for branch circuits	C	
	B. A supplementary type	NA	
19.7	If a positive temperature coefficient device is used, customer should provide compliance of that positive temperature coefficient device with Manufacturing Deviation and Drift; Endurance; and Requirements for Controls Using Thermistors in UL 60730-1/CSA C22.2 E60730-1.	NA	
19.9	If fuses are used, customer provides their compliance with CSA C22.2 No.248.1/UL 248-1. Fuseholders being used with these fuses also comply with CSA C22.2 No. 4248.1/UL 4248-1.	NA	
19.10	Replaceable fuses are marked in accordance with <i>Section 46</i> and located adjacent to each fuse or fuse holder, on the fuse holder, or in another location obvious. Replaceable fusing characteristics such as time delay or breaking capacity possess identification and information on proper fuse replacement within the eBike product instructions.	NA	
MOTORS AND MOTOR CONTROLLERS			
20.1	The eBike product has no hazards present when tested in Locked Rotor and Overload Conditions.	C	
20.2	The motor does not display any exceeding temperature on the insulation or windings when experiencing maximum normal anticipated loads.	C	
20.4	Sensors and motor controls performing safety functions are compliant with the requirements of the appropriate control's standard. If applicable, the eBike's startup assistance function control should need a voluntary continuous action by the user to allow startup assistance. (ex. A dead man switch)	C	
GROUNDING AND BONDING			
22.1	General		
22.1.2	Customer provides means of extending the ground to the eBike through a bonding conductor for both on board and off board chargers.	C	



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Ref. #	Test Description	Result	Observations and Notes
22.2	Bonding Connections		
22.2.1	Any dead metal parts that contain potential risk of getting energized and that are accessible to the user during operation, contain appropriate provisions to allow for the bonding of these dead metal parts to the main ground connection.	C	
22.2.2	The bonding used meets the following criteria: a. Constructed of a positive mean (clamps, rivets, bolt or screw connections, welding, soldering, or brazing) b. Made of material with a softening or melting point above 455° C (850° F) c. Capable of penetrating nonconductive coatings (paint or vitreous enamel) d. Is not dependent on the clamping action of rubber or similar material	C	
22.2.3	The equipment bonding terminal or lead-bonding point connected to frame is through a positive mean (i.e. screw or bolt connections) and not accessible from outside of the enclosure.	C	
22.2.4	This equipment-bonding terminal is capable of penetrating nonconductive coating (paint or vitreous enamel).	C	
22.2.5	The equipment-bonding point is located in a location that prohibits the risk of inadvertently removing the bonding during servicing.	C	
22.2.6	The equipment-bonding lead is the same size as the grounding lead associated with the AC power source and contains a green surface insulation color.	C	
22.2.7	If the eBike connects to a NEMA 5-20R receptacle directly, (i.e. <i>Does not connect through an off-board charger</i>) the equipment-grounding conductor of the powersupply cord is connected to dead metal parts within the frame enclosure by a screw, stud or nut combination, or any other means that can't be removed during ordinary servicing when not involving a power supply. This grounding conductor insulation is green and can have one or more yellow stripes to identify it. No other conductor is similar in identification.	C	
22.2.8	The equipment-grounding conductor or equipment-bonding conductor is not spliced or involves any tracing on a printed wiring board.	C	
22.2.9	The equipment grounding or equipment bonding does not incorporate a soldering lug, a screwless push in connector, a quick connect, or any other type of friction-fit connector.	C	
22.2.10	The equipment-grounding terminal or equipment-bonding terminal is successfully capable of securing a conductor of a size intended for its specified application.	C	
22.2.11	The terminal used for connecting the equipment bonding conductor has one of the following identification markings: a. Being marked "G", "GR", "GND", "Ground", "Grounding", or the like; or b. The grounding symbol illustrated in Figure 22.1 on or adjacent to the terminal or on a wiring diagram provided on the product	C	
CHARGERS			
23.1	Customer provides compliance of their eBike charger with one of the following criteria:		
	A) UL 1012, and CSA C22.2 No. 107.1.	NA	



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Ref. #	Test Description	Result	Observations and Notes
	B) UL 1310 and CSA C22.2 No. 223.	NA	
	C) UL 60950-1/CSA C22.2 No. 60950-1, along with the relevant Part 2 Standard as applicable	NA	
	D) UL 62368-1/CSA C22.2 No. 62368-1.	C	
INPUT TEST			
27	The current supplied to the battery from the specified external charger does not exceed more than 110 % of the max rated current for the eBike and does not exceed the rated output current for the external charger.	C	STQ Test Report SZ2021051086-5
TEMPERATURE TEST			
28	Temperatures monitored on the temperature sensitive components, enclosures, and user accessible surfaces must not exceed their specifications. During the procedure, the battery does not present any flame, molten metal, risk of fire ignition, electrical shock, or potential for injury to users.	C	
INSULATION RESISTANCE TEST			
29	Adequacy of Insulation Test	C	STQ Test Report SZ2021051086-5
DIELECTRIC STRENGTH TEST			
30	Dielectric Breakdown Strength Test	C	STQ Test Report SZ2021051086-5
MOISTURE CONDITIONING			
31	Humidity Conditioning	C	STQ Test Report SZ2021051086-5
ABNORMAL OPERATION TESTS			
32.2	During the overcharging procedure, the battery does not present any flame, molten metal, risk of fire ignition, electrical shock, or potential for injury to users.	C	
32.3	Component Fault Tests	C	STQ Test Report SZ2021051086-5
32.4	Forced Ventilation/Blocked Ventilation	C	
32.5	Locked Rotor Motor Test	C	STQ Test Report SZ2021051086-5
32.6	Running Overload Test	C	STQ Test Report SZ2021051086-5
32.7	Short Circuit Test	C	
32.8	During the imbalanced charging procedure, the battery does not present any flame, molten metal, risk of fire ignition, electrical shock, or potential for injury to users.	C	
32.9	Shock Test	C	
32.10	Thermal Cycling	C	
UL 2271 Specific Overdischarge Test			
25	Overdischarge Test	C	
IMPACT RESISTANCE TO HEAT			
33	Impact Test	C	STQ Test Report SZ2021051086-5
STRESS ON CASTING			



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Ref. #	Test Description	Result	Observations and Notes
34	Mold Stress	C	STQ Test Report SZ2021051086-5
BENDING TEST			
35	Flexing Test	NA	STQ Test Report SZ2021051086-5
INFILTRATION PROTECTION TEST			
36	Ingress Protection Test	C	STQ Test Report SZ2021051086-5
DURABILITY OF MARKINGS			
37	Permanence of Marking	C	
VIBRATION RESISTANCE TEST			
38.1	Complete Device	C	STQ Test Report SZ2021060590E
38.2	Batteries / Battery Packs	C	
CABLE TIE			
39.2	Strain Relief – Pull Test	NA	STQ Test Report SZ2021051086-5
39.3	Strain Relief – Push Back Test	NA	STQ Test Report SZ2021051086-5
TESTING THE STARTING ASSIST MODE			
40.1	Assistant Control Activation	NA	STQ Test Report SZ2021051086-5
40.2	Test Setup for Clearance of Ground	NA	STQ Test Report SZ2021051086-5
40.3	Return State of Motor to No Load Current	NA	STQ Test Report SZ2021051086-5
40.4	Maximum Speed	NA	STQ Test Report SZ2021051086-5
40.5	Engine Observation	NA	STQ Test Report SZ2021051086-5
ENGINE ASSISTANCE CONTROL			
41.2	Reverse Pedaling Test	C	
41.3	Pedal Cessation Test for EPAC's	C	STQ Test Report SZ2021051086-5
41.4	Cutoff When Braking Test	C	
41.5	Cutoff at Maximum Speed Test	C	
VERIFICATIONS POST STQ OUTSOURCE TESTING			
11.2. b.	<p>If the battery pack is compliant with standards c. CSA C22.2 No. 62133/UL 62133 or d. UL 2054, the battery pack remains compliant throughout the following test:</p> <ul style="list-style-type: none"> a. Over Charging Test (Standard Section 32.2) b. Short Circuit Test (Standard Section 32.7) c. Imbalanced Charging Test (Standard Section 32.8) d. Shock Test (Standard Section 32.9) e. Vibration Test (Standard Section 38.2) f. Thermal Cycling Test (Section 32.10) 	C	



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Ref. #	Test Description	Result	Observations and Notes
13.3.1. b.	The enclosure remains compliant after undergoing Impact Test	C	
14.1. b.	The components of the eBike remain compliant after undergoing Vibration Test	C	
18.8.b.	Internal wiring components mounted on the eBike remain compliant after undergoing Flexing Test	NA	
MARKING			
42.	General		
42.1	For any etched or adhesive labels used on the product, they must be compliant with UL 969 and CSA C22.2 No. 0.15 for intended exposure conditions and compliant throughout the Permanence of Marking test.	C	STQ Test Report SZ2021051086-5
NAMEPLATE AND IDENTIFICATION			
43.1	The eBike product incorporates the markings listed below: a. The manufactures name b. The trade name c. Trademark or descriptive marking identifying organization responsible for product d. The part number or model number e. The electrical ratings	C	
43.2	Products shall be marked with the date of manufacture, which may be in the form of a code that does not repeat within 10 years.	C	
43.3	Products with a battery pack that incorporates a battery management system residing in components or circuits outside the battery pack are marked with the charger that is specified for its use.	C	
43.4	Identification markings and polarity markings (if applicable) are present on all external terminals, including the battery terminals if pack is not keyed, and connections that are intended to be made in the field.	NA	
43.5	A factory identification code exists on the product and specifies the location where the product's systems were produced and assembled if manufacture has more than one factory location.	C	
CAUTIONARY MARKINGS			
44.1	The words, "CAUTION", "WARNING", OR "DANGER" are displayed in a cautionary marking with letters no less than 3.2 mm (1/8 inch) tall. Any remaining letters in a cautionary marking are no less than 1.6 mm (1/16 inch) tall. The words, "WARNING" or "DANGER" can be used alternatively for the word, "CAUTION".	C	
44.2	Cautionary markings are located on a part that is not removable; or if removable, on a part that impairs the operation of the unit when removed. The marking is visible and legible to the operator during normal operation of the unit.	C	
INSTRUCTIONS			



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Ref. #	Test Description	Result	Observations and Notes
45.1	The eBike product includes the following instructions with it: a. Legible installation instructions b. Operation instructions c. Instructions pertaining to a risk of fire, electric shock, or injury to persons associated with the use of the product d. Maintenance instructions e. Moving and storage instructions pertaining to the use of the product by the end user	C	
45.2	Instructions are either in separate manuals or combined in one or more manuals when instructions for risk of fire, electrical shock, or injury to persons are separated in format and emphasized to distinguish themselves from the rest of the text.	C	
45.3	Illustrations may be present to help clarify the intent of the instructions but do not replace written instructions	C	
45.4	The following details are displayed in all upper-case letters or emphasized to differentiate themselves from the rest of the text The headings for the installation, operation, user maintenance, and moving and storage instructions; The heading for the instructions pertaining to a risk of fire, electric shock, or injury to persons; and The opening and closing statements of the instructions specified in 48.3 – "IMPORTANT SAFETY INSTRUCTIONS" and "SAVE THESE INSTRUCTIONS", or the equivalent.	C	
45.5	Text of all instructions is in the words specified or words that are equivalent, clear, and understandable. Substitution of the signal word "DANGER" for "WARNING" is allowed, when the risk associated with the eBike is such that a situation exists which, if not avoided, will result in death or serious injury. For any other signal words besides the substitution of "DANGER" and "WARNING," if a specific conflict exists in the application of such wording to an eBike, modified wording is allowed.	C	
INSTRUCTIONS RELATING TO THE RISK OF FIRE OR ELECTRIC SHOCK			
46.1	The product includes instructions relating to a risk of fire or electric shock warning the user of inherent risk. These instructions are preceded by the heading, "INSTRUCTIONS PERTAINING TO RISK OF FIRE or ELECTRIC SHOCK" or the equivalent.	C	
46.2	Numbering of the items in the list below can also include other instructions pertaining to a risk of fire, electric shock, or injury to persons that the manufacturer determines to be necessary and that do not conflict with the intent of the instructions.	C	



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Ref. #	Test Description	Result	Observations and Notes
46.3	<p>Instructions pertaining to risk of fire, electric shock, or injury to persons includes items listed below with the statement "IMPORTANT SAFETY INSTRUCTIONS" preceding the list and the statement "SAVE THESE INSTRUCTIONS" or the equivalent either preceding or following the list. The word "WARNING" is entirely in upper case letters, so it is distinguished from the rest of the text.</p> <p style="text-align: center;">" IMPORTANT SAFETY INSTRUCTIONS</p> <p>WARNING – When using this product, basic precautions should always be followed, including the following:</p> <ol style="list-style-type: none"> a. Read all the instructions before using the product. b. To reduce the risk of injury, close supervision is necessary when the product is used near children. c. Do not put fingers or hands into the product. d. Do not use this product if the flexible power cord or output cable is frayed, has broken insulation, or any other signs of damage. e. For an off-board charger provided with a field wiring terminal or leads, the installation instructions shall state that the installation is intended to use copper wires only. f. For an off-board charger, when a pressure terminal connector, or the fastening hardware, are not provided on the unit as shipped. The instruction manual shall indicate which pressure terminal or component terminal assemblies are for use with the unit. g. With reference to (f), the terminal assembly packages, and the instruction manual shall include information identifying the wire size and the manufacturer's name, trade name, or other descriptive marking by which the organization responsible for the product is identified. h. When a pressure terminal connector provided on an off board charger, for a field installed conductor requires the use of other than an ordinary tool for securing the conductor, identification of the tool and any required instructions for using the tool shall be included in the installation instructions. i. The instruction manual for a unit where the abnormal test is terminated by operation of the intended branch circuit over current protective device, shall include the word "CAUTION" and the following or equivalent: "To reduce the risk of fire, connect only to a circuit provided with _____ amperes maximum branch circuit overcurrent protection in accordance with the National Electrical Code, ANSI/NFPA 70." The blank space is to be filled in with the applicable ampere rating of branch circuit overcurrent protection. j. For all equipment, the instructions shall indicate "This equipment is not intended to be used at ambient temperatures less than ____°C (____°F) or above ambient temperatures of ____°C (____°F)." The blanks are to be filled in with the manufacturer's specified ambient temperature ratings. k. For all equipment, the instructions shall indicate "The battery is intended to be charged when the ambient temperature is between ____°C (____°F) and ____°C (____°F). Never charge the battery when ambient temperatures are outside this range." The blanks are to be filled in with the manufacturer's specified ambient temperature range for charging. 	C	



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Ref. #	Test Description	Result	Observations and Notes
46.4	<p>SAVE THESE INSTRUCTIONS “ If applicable per product, the instructions described are included in the instructions pertaining to a risk of fire, electric shock, injury to persons, or installation instructions. If these instructions are included in the installation instructions than a reference to these instructions is listed throughout the list stated in Section 46.3 above. The headings and the word “WARNING” is entirely in upper case letters or emphasized to distinguish it from other text.”</p> <p style="text-align: center;">GROUNDING INSTRUCTIONS</p> <p>This product must be grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This product is equipped with a cord having an equipment grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes’ ordinances.</p> <p>WARNING – Improper connection of the equipment grounding conductor is able to result in a risk of electric shock. Check with a qualified electrician if you are in doubt as to whether the product is properly grounded. Do not modify the plug provided with the product – if it will not fit the outlet, have a proper outlet installed by a qualified electrician. “</p>	NA	
INSTALLATION INSTRUCTIONS			
47.1	Installation instructions contain all the information needed to install the product for use as intended, and are preceded by the heading, “INSTALLATION INSTRUCTIONS” or the equivalent.	C	
OPERATING INSTRUCTIONS			
48.1	The eBike product’s operating instructions have all the information needed to operate as anticipated and are preceded by the heading “OPERATING INSTRUCTIONS” or equivalent.	C	
48.2	The operating instructions include a reference to the instructions pertaining to a risk of fire, electric shock, or injury to persons.	C	
48.3	<p>The manual includes the following:</p> <ul style="list-style-type: none"> a. Instructions regarding battery charging, temperature limits for equipment use and storage, battery use and storage, and the recommended temperature range for charging. b. A warning provided against modifying or attempting to repair the eBike system except as indicated in the instructions for use and care. 	C	
48.4	An indication is placed within the operating instructions that the eBike should only be charged with the manufacturers recommended charging instructions.	C	
USER MAINTENANCE INSTRUCTIONS			
49.1	The eBike’s user maintenance instructions includes explicit instructions for all cleaning and servicing that is anticipated to be done by the user and is preceded by the heading “USER MAINTENANCE INSTRUCTIONS” or equivalent.	C	
49.2	If the eBike has replaceable fuses, the user maintenance instructions contains fuse replacement instructions that reference the correct fuse rating needed to be use.	NA	
MOVING AND STORAGE INSTRUCTIONS			

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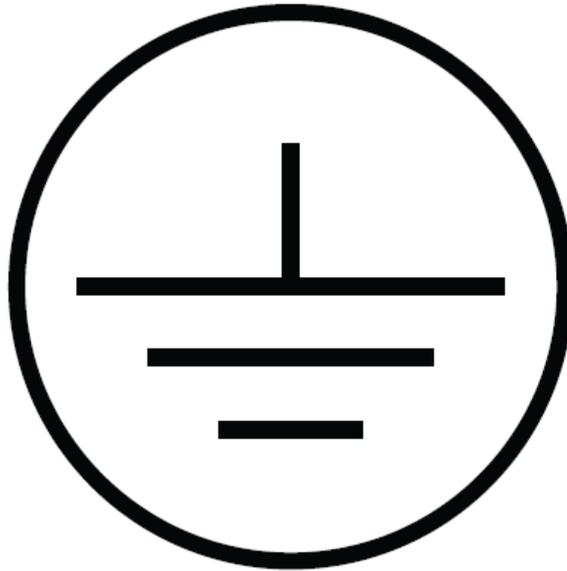
Ref. #	Test Description	Result	Observations and Notes
50.1	The eBike contains instructions describing proper moving and storage procedure with a heading preceding it stating "MOVING AND STORAGE INSTRUCTIONS" or the equivalent.	C	

Circuit tension (volts) ^a	Inherently limited transformer (protection against over-intensities not required)			Transformer not inherently limited (protection against over-intensities required)			
	0 - 20 V CA or CC ^b	More than 20V, but no more than 30V CA or CC ^b	More than 30V, but no more than 60V CC ^b	0 - 15 V CA or CC ^b	More than 15V, but no more than 20V CA or CC ^b	More than 20V, but no more than 30V CA or CC ^b	More than 30V, but no more than 60V CC ^b
Power limitation (volts-amperes) ^b	-	-	-	350	250	250	250
Power limitation (amperes) ^d	8	8	150/V ^a	1000/V ^a	1000/V ^a	1000/V ^a	1000/V ^a
Maximum protection against over-intensities (amperes)	-	-	-	5	5	100/V ^a	100/V ^a

a. Maximum output voltage, regardless of the load, with rated voltage applied.
 b. The CA waveform must be sinusoidal.
 c. Maximum volt-ampere output, regardless of load, and protection from over-intensities (if any) bypassed.
 d. Maximum output after 1 minute of operation under a non-capacitive load, including short circuits and with protection against over-intensities (if provided) bypassed.

Table 8.1 – Low Energy Low Voltage Circuits

Figure 22.1
Symbol for equipment bonding connection



END OF REPORT