

**Submission
No 31**

ELECTRIC AND HYBRID VEHICLE BATTERIES

Organisation: Zipidi

Date Received: 26 March 2024

About Zipidi

Zipidi is a specialist micromobility consultancy. We have worked with regulators, manufacturers, insurers, technology providers, data specialists and businesses worldwide since 2018. We have deep expertise in micromobility vehicles and key components such as batteries, battery management systems and internet of things (IoT) components - all of which are common in eBikes and PMDs/LEVs.

Introduction

Lithium-ion battery fires are an increasingly common occurrence around the world. While this enquiry is related to electric vehicles, hybrids and light electric vehicles (LEVS), lithium-ion batteries and fires are also common in:

- Power tools
- Household products, e.g. vacuum cleaners
- Children's toys,
- Technology such as computers and mobile phones

The vast majority of fires occurring from lithium-ion batteries are from poor quality batteries which do not meet Australian or international standards.

The sale and use of these batteries in Australia is caused by:

- Poor importation regulations.
- Self-declared compliance by manufacturers/importers.
- Little/No checking by Border Control that products match what is claimed or that they comply with Australian regulations.
- No way of identifying if a product complies with standards.
- No method to ensure certifications claimed are authentic and not faked.
- No testing laboratories within Australia of devices/batteries or processes to verify offshore certifications.
- Unharmonised vehicle standards and usage laws between Australian States and Federal regulations
- No harmonisation of Australian standards with international standards.
- Poor tracking of devices and batteries and their links to owners.

While there are many problems with the Australian regulatory environment, there are logical solutions which can be implemented quickly. Other countries, such as Singapore and Spain have done so.

Recommended Solution for Australia/NSW

A solution requires stronger regulations and enforcement together with significant communication and education to retailers, riders, emergency services, transport departments, property managers and the broader community.

While harmonised regulation in Australia is desirable, NSW should take a leadership position in specifying regulatory requirements, rather than wait in hope for Australian harmonisation to occur.

Solution Summary

1. Every light electric vehicle/battery to be required to have an Advisory Notice or Equivalent.
2. Australia/NSW require specific certifications for light electric vehicles/batteries to be allowed to be used.
3. Australia/NSW adopt the EU Battery Regulation 2023/1542 which defines battery standards, carbon footprint measurement, recycling standards and more - it is the gold standard for battery regulation.
4. Every light electric vehicle or component to have vehicle and certifications verified in Australia before sale or use.
5. All light electric vehicle specifications, battery specifications and certifications must have proven authentication as being real and compliant - not faked or counterfeit.
 - a. Affordable technology solutions already exist to solve this problem.
 - b. CREDZ is an Australian solution leveraging technology developed by the CSIRO and NSW company, Laava.
6. An online database of approved light electric vehicles and batteries is published as the only approved products (other countries have done this).
7. A trustmark smart label is required on every light electric vehicle and battery at the serial number level which links to provable specifications, certifications and ownership.
8. A transition program be implemented to allow illegal and non-compliant light electric vehicles/batteries to exit the market through incentives and obsolescence. Singapore, Spain, New York and others have done such programs.
9. Communication and education programs are developed and focussed on all key stakeholders in the EV, Hybrid and LEV communities - from manufacturers to retailers to end users and other impacted communities.

Solution in More Detail

1. **Require every bike/LEV to have an Advisory Notice to allow importation.** This system exists within the Federal Department of Transport and is currently optional.
 - a. NSW could **require** an Advisory Notice for each bike/light electric vehicle permitted to be sold/used in NSW - even if other States do not. As the largest State, this would become the default as most manufacturers/importers have common products across Australia.

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2. **Specify what worldwide certifications are mandatory for batteries in light electric vehicles sold and used in NSW.** Standards already exist but are not mandated or checked.

A range of different certifying bodies exist, so not every light electric vehicle/battery may require every certification. As other countries already have certification requirements, many of the quality brands within Australia already meet these standards - but there is no easy way of identifying their compliance/quality compared to poor quality, non-compliant products.

Key certifications for electric bikes, LEV and batteries are included in the list below. To receive such a certification requires companies to submit products to laboratories for testing and certification. Each certification only applies to the specific model tested and new certifications are required every time a product is updated or if the certification has an expiry period.

UN 38.3 UN Transportation of Lithium metal and Lithium-ion batteries

UL2271 Standard for Batteries for Use in Light Electric Vehicle Applications

UL2272 Standard for Electrical Systems for Personal E-Mobility Devices.

UL2849 Standard for Electrical Systems for e-Bikes, for the electrical system of any powered bicycle sold, distributed, leased, or rented in New York City.

IEC 62133-2:2017, with CB Certificate

Safe operation of lithium batteries. You can search to see if a CB certificate is valid <https://certificates.iecee.org/#/home> they also name and shame fake tests.

CLC EN 50604-1:2016

European Committee for Electrotechnical Standardization Lithium Batteries for light electric vehicles

CLC EN 61000-6-3:2007/A1:2011/AC:2012

Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

Directive 2014/30/EU of the European Parliament and of the Council

Harmonisation of the laws of the Member States relating to electromagnetic compatibility

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EN IEC 61000-3-2:2019

Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions

EU Battery Regulation 2023/1542

Extensive Requirements increasing from 2023 until 2030

Material safety data sheet (MSDS)

A must have and is only valid until December 31st in the year of the test.

CE-EMC, EMC certification

A mandatory requirement in Australia and regulated by the ACMA (Australian Communications & Media Authority, retesting if there are component changes.

IP 54

Dust and Waterproof Levels, may want higher than 54. The number represents the dust and waterproof level of a battery/light electric vehicle. Test does not expire unless battery components and manufacturer changes.

3. Australia/NSW adopt the EU Battery Regulation 2023/1542

- a. This was enacted in July 2023 by the EU Parliament after years of research and development. It is the best regulatory framework anywhere in the world and covers:
 - i. Sustainability
 - ii. Safety
 - iii. Labelling
 - iv. Marketing and Information
 - v. Due Diligence
 - vi. Waste Battery Management
 - vii. Digital Battery Passport
- b. Australia/NSW should be a policy taker (not maker) for batteries. Quality manufacturers already comply with the early requirements of the EU Battery Regulations, which increase in requirements every year until 2030.
- c. Should Australia have lesser standards than the world's best it will become a dumping ground for poor quality, dangerous products.

4. **NSW to require all light electric vehicle/battery certifications from offshore laboratories to be verified by specified Australian laboratories/authorities before sale and use is permitted in NSW.** Spain implemented such an approach in January 2024 with specific laboratories required to be used. Once certification is gained/confirmed the products are added to Spain's approved products online database.

5. All Light Electric Vehicle/Battery Specifications/Certifications to have Provable Authentication

- a. The CSIRO and NSW company Laava have developed patented AI imaging technology to allow any product to be authenticated as real and compliant with regulations, anywhere in the world.
- b. The technology has been applied to more than 10 million products worldwide.
- c. Using the CSIRO/Laava technology, Zipidi has developed micromobility solutions leveraging the core CSIRO/Laava technology. This solution is known as CREDZ.
- d. CREDZ uses metadata linked to manufacturing and other records to verify the authenticity of light electric vehicles and batteries and their compliance with regulatory standards.
- e. CREDZ are low cost to implement and can be scaled to any number required.
- f. CREDZ also does document authentication and can authenticate certifications as being real and not faked.
- g. CREDZ authenticates light electric vehicles and batteries at the serial number level and allows linkage to owners to enable notifications/alerts for the lifecycle of the product.
- h. CREDZ are smart images which can be scanned on any mobile phone to allow information and enforcement to be shared instantly.

A simple example is this CREDZ image which can be scanned on any mobile phone at www.credzid.com/scan . This shows an example of an Australian lithium-ion battery. More information on CREDZ is provided as an addendum



- i. CREDZ solves many of the problems related to LEVs and batteries:
 - i. A visible trust mark to distinguish quality products
 - ii. Instant access to critical information whether for enforcement, first responders, owners, riders or other stakeholders.
 - iii. A direct link to owners to allow communication in the event of a product issue or recall.
- 6. An online database of approved devices and batteries is published as the only approved products.** Spain and other countries have implemented this approach. It can apply to vehicles and batteries. It provides an easy reference for retailers, riders and others to ensure a vehicle/battery is approved.

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- a. Linkages to such a database can be linked to CREDZ to enable even easier access and proof of authenticity.
- b. Here is a link to the Spanish database, and a screenshot, as an example, <https://www.dgt.es/nuestros-servicios/tu-vehiculo/vehiculos-de-movilidad-personal-vmp/>



Certified brands and models

When purchasing a VMP, keep in mind that VMPs marketed after January 22, 2024 must be certified for use. VMPs marketed until January 21, 2024 may circulate until January 22, 2027 even if they do not have a certificate. From that date, only VMPs that have the certification will be able to do so .

The list of brands and models that currently have a VMP Certificate, according to the VMP characteristics manual published by [Resolution of January 12, 2022, of the General Directorate of Traffic](#) , is as follows:



As of January 22, 2027, only VMPs that comply with the provisions of the VMP characteristics manual and, therefore, that have a VMP certificate number will be able to circulate.

Brand	Model	VMP Certificate
Cecotec	7303	A1000
Cecotec	7302	A1001
Cecotec	7304	A1002
Cecotec	7305	A1003
Cecotec	7104	A1014
Cecotec	7311 - Version 7324	A1015
Cecotec	7106	A1016
Cecotec	7105	A1017
Cecotec	7109	A1018
Cecotec	7107	A1019
Cecotec	Z - City and Mountain versions	A1023
Cecotec	7318	A1048

7. **A trustmark smart label is required on every light electric vehicle and battery at the serial number level which links to provable specifications, certifications and ownership.**

CREDZ can be the trustmark to prove quality, specifications, certifications and ownership. CREDZ is the enabler managing compliance to standards and related information.

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8. **A transition program be implemented to allow illegal and non-compliant light electric vehicles/batteries to exit the market through incentives and obsolescence.**

Singapore, Spain, New York and others have done such programs. Elements of such a program can include:

- a. A near term date where all new light electric vehicles/batteries must comply - say 1 January 2025
- b. A longer date where all non compliant light electric vehicles must be removed, made compliant, traded in or scrapped - say 1 January 2026
- c. A government funded bounty program for bringing in non-compliant light electric vehicles and batteries. There may be a subsidy towards purchase of a new light electric vehicle/battery or a simple cash back. Singapore and New York have done such programs. Other jurisdictions have had it as part of their light electric vehicle incentive programs.

9. **Communication and Education Programs**

These will be key to success and required for many user/stakeholder groups. They must deliver consistent messaging to ensure awareness and understanding. Targets for such programs will include:

- a. Manufacturers
- b. Retailers
- c. Vehicle Repairers/Maintenance providers
- d. Consumers/Riders
- e. Businesses with fleets
- f. Fire, Emergency Services and other First Responders
- g. Children through school programs
- h. Others as identified

These should be government backed programs to ensure consistent messaging for all users. It could be on the scale of a *Slip, Slop, Slap* or *Life Be In It* campaign due to the pervasiveness of batteries touching every Australian every day.

Messaging could cover:

- Buying advice and how to know light electric vehicles/batteries are approved and certified
- User advice including safe charging practices
- Safe storage practices
- Fire advice - if a fire occurs what to do
 - Guides for owners
 - Guides for first responders
- Safe riding practices
- Links to more detailed information



Authentication Verification, & Services for Micromobility Devices & Components





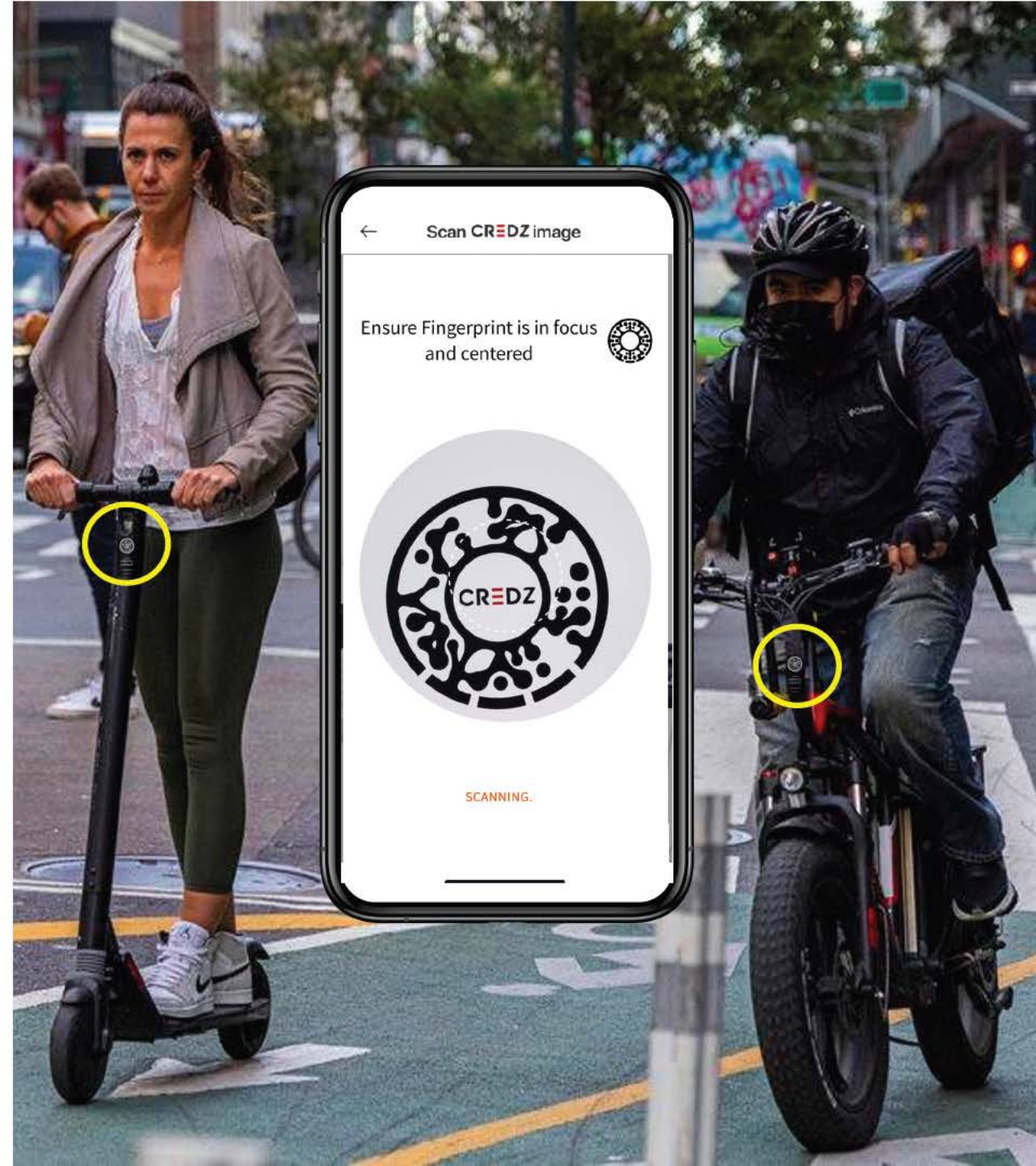
Scan – Verify – Connect

CREDZ are scannable, randomly generated images - not codes - unique per item using advanced computer vision technology. This makes CREDZ secure, cost-effective and very easy to deploy.

Linked to blockchain metadata, CREDZ provides access to secure applications for manufacturers, retailers, owners, service providers, and government.

- ≡ Each device is identifiable at the serial number level
- ≡ Scan to register the warranty
- ≡ CREDZ acts as a customer service concierge
- ≡ Verifiable as a compliant device for its country, state or city
- ≡ Able to provide a range of instant services to users, logbook service records, proof of ownership, rewards, loyalty and more

For a simple CREDZ example, scan the code on this slide on a mobile phone at www.credzid.com/scan



CREZDZ - The Problems Solved



CREZDZ enables vehicle credentials to be verified instantly, connected to customers and securely shared with service providers



Trusted Vehicle, Battery, Charger Credentials

- ≡ CREZDZ are secure digital twins of products, right down to the serial number level, linked to immutable production records of models and their specifications.
- ≡ CREZDZ authenticates if a product meets the regulatory requirements of the Country, State and/or City within which it is located.
- ≡ Specifications are shared with users with local riding regulations.



Connecting Customers with Vehicles

- ≡ CREZDZ can be used to record a warranty and ensure manufacturers, retailers, and distributors have customer information.
- ≡ Rewards and loyalty programs can be linked to registered vehicles providing customers with richer and more rewarding brand experiences.
- ≡ Enable proof-of-ownership, change of ownership and individual-specific notifications.



Sharing Verified Details for Services

- ≡ Instantly share authenticated customer information and vehicle specifications with trusted service providers.
- ≡ CREZDZ digital logbooks to keep track of the life history of any vehicle and its core components.
- ≡ Instantly share authenticated vehicle specifications with insurers for instant cover.




CREZ – Questions Answered

- 1. Is my bike, scooter, battery or charger authentic?***
- 2. Does my bike, scooter, battery or charger comply with the laws/regulations of wherever I am?***
- 3. Are the certifications of my products real and current or fake?***
- 4. What are the riding rules for my location?***
- 5. How do I use and manage my battery safely?***
- 6. Can I recharge my bike/scooter at this public charging station?***
- 7. Can I take my e-bike or e-scooter on public transport?***
- 8. Can I recharge my e-bike or e-scooter in this building?***
- 9. Is my e-bike/e-scooter eligible for insurance?***


Vehicle Results Screen from Scan

Scans are customised to product requirements with user-specific geolocation, metadata and regulatory information




Verified

NIU KQi3 MAX ELECTRIC SCOOTER



This scooter has been verified as genuine and certified as complying with Australian standards.

UL 22721 CERTIFIED



Serial Number: 43210987

Register Your Warranty

Manufacturing Journey

Manufactured
15 January 2023
Changzhou, China

Shipped to Australia
22 January, 2023
Ningbo, China

Cleared Australian Customs
24 February, 2023
Melbourne Container Terminal

Distribution Centre
27 February, 2023
Tullamarine, Victoria AU



NIU KQi3 Max Electric Scooter...

**Max Performance
Maximum Thrill**

**Range up to 65km
25km/h Top Speed**

Key Details

Distance
Up to 65km on a single charge

Speed
Up to 25 km/h

Run Time
Up to 3 hours of continuous use

Battery
608 Wh lithium-ion, rechargeable (UL2271 certified)

Weight
21.1 kg

LEARN MORE AND BUY

WA eScooter Law

Based on your location

CHECK OTHER LOCATIONS

Local Riding Rules

Current as at 10 February, 2023

Minimum Age	-	16
Maximum Speed	-	25 kph
Helmets	-	Required
Permitted on Footpaths	-	Yes 10kph
Permitted on Shared Paths	-	Yes 25kph
Permitted in Bike Lanes	-	Yes 25kph
Permitted on roads with a speed limit up to 50 kph	-	Yes 25kph

Banned on roads with a speed limit over 50 kph

Manufacturer Specification




Brand	-	NIU
Model	-	KQi3 Max
Length	-	1130 mm
Width	-	542 mm
Height	-	1202 mm
Weight	-	21.1 kg
Wheel Diameter	-	9.5" Self Healing Pneumatic Tubeless Tires (Puncture Resistant)
Maximum Speed	-	15.5 mph/25 kph
Range	-	Up to 65 km
IP Rating	-	IP54
Nominal Power	-	450W Max 900W
Battery	-	608 Wh

Compliance

- ✓ Australia
- ✓ ACT
- ✓ Queensland
- ✓ Tasmania
- ✓ Victoria
- ✓ Western Australia

CHECK OTHER LOCATIONS

Follow NIU on Socials



Powered By
CREDZ

- ≡ Results can be as finite as serial number level
- ≡ Content can be delivered in any media format.
- ≡ Result screens can link to third-party databases

Car Battery Scan

at www.credzid.com/scan



- Scan the fingerprint on any battery to verify its credentials and compliance with regulations.
- CREDZ fingerprints are secure and unique. They are linked to tamperproof production records.
- Templates can vary for battery types, locations and brands.

Certified

OPTIMA YELLOWTOP D31A
DEEP CYCLE BATTERY

This battery has been certified as genuine and meeting international and USA Standards for battery cell quality, safety and sustainability.

Optima Yellowtop D31A

Serial Number: 43210987

CERTIFICATIONS

- IEC 62485-2:2010**
Safety requirements for secondary batteries and battery installations
- IEC 60095-1:2018**
Lead-acid starter batteries
- ISO 9001**
Quality Management
- Material Safety Data Sheet**
Detailed specifications for safe transport of lithium ion batteries

Register Your 36 Month Warranty

Manufacturing Journey

- Manufactured**
15 January, 2023
Nuevo Leon, Mexico
- Shipped to USA**
22 January, 2023
Monterrey, Mexico
- Cleared USA Customs**
24 January, 2023
Houston, Texas
- Distribution Centre**
27 January, 2022
Milwaukee, Wisconsin

Safety Tips

Carlos Content

Carlos Content

Carlos Content

Are OPTIMA Batteries Made In ...

Key Details

- Voltage**
12V
- Capacity**
50 Ah
- Warranty**
36 Months
- CCA**
800
- Weight**
17.2 kg
- Recycling**
Up to 99%

Manufacturer Specification

Brand	-	Optima
Model	-	Yellowtop D31A
Length	-	254 mm
Width	-	171 mm
Height	-	99 mm
Weight	-	17.20 kg
Voltage	-	12V
Capacity	-	50Ah
CCA	-	900
Terminal Type	-	SAE Type A
Guarantee	-	3 years
Battery Type	-	Lead Acid AGM

Compliance

- USA
- Europe
- UK
- Canada
- Australia/New Zealand

CHECK OTHER LOCATIONS

Follow Optima on Socials

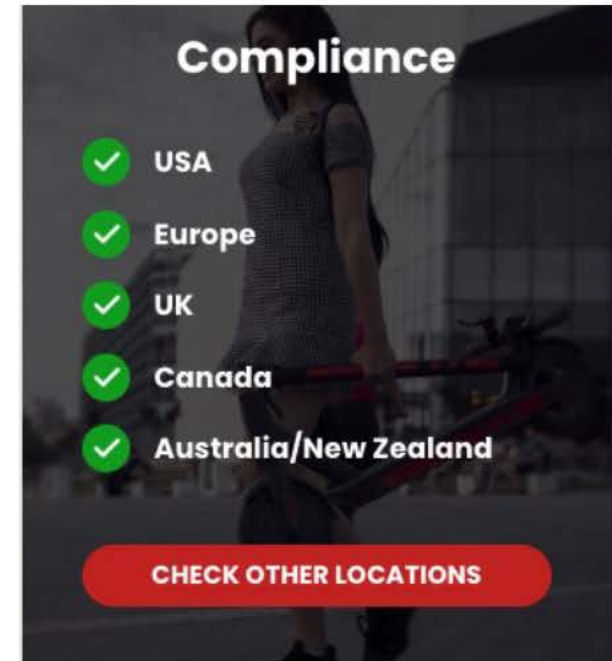
Powered By

CREDZ

Verify

CREDZ verifies battery information against regulations for any country, region, state or city using customers' locations

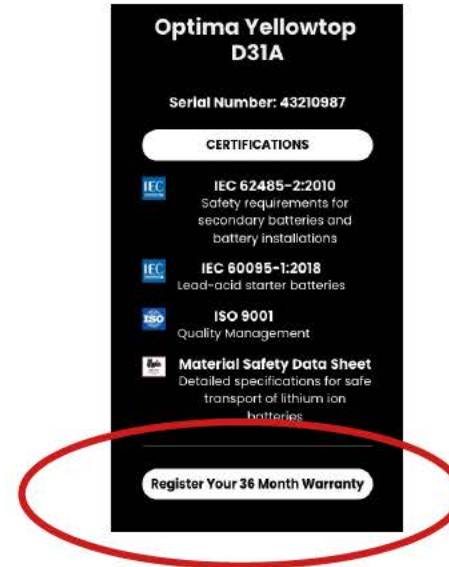
- Product Journey
- Materials used
- Manufacture date
- Compliance with any regulations
- Batch or Serial Number of battery
- Date of sale
- Retailer/ Partner who sold the battery
- Name of the person who purchased the battery
- Name of person or retailer who activated CREDZ warranty
- Location where warranty was activated
- Battery health information if BMS enabled



Connect

Registering a warranty and capturing key customer data is easy with **CREDZ**

- **Connect** with your customers to make onboarding, warranty registration and engagement easy!
- **CREDZ** connects brands with customers offering users a range of digital experiences and benefits.
- Offer value-added experiences and solutions such as :
 - Warranty management
 - Digital Battery Passports
 - Product expiry notification and management
 - Product recall management
 - Upsell and cross-sell products and services



Clarios Battery Warranty Registration

Thank you for purchasing a Clarios Battery please fill in the form below to register your 3-year warranty.

By scanning the CREDZ image on your battery, we have identified your battery as:

- Optima Yellowtop D31A
- Serial Number 43210987
- Purchased 25 February 2023
- Retailer, O'Reilly Auto Parts, Mountain View, CA

By registering your battery for warranty you will receive a CREDZ Digital Passport for your battery. This will keep all details of your battery available and keep you informed expiry dates, upgrades and any necessary alerts.

stephen@localift.net [Switch accounts](#)



*Required

Email *

Your email address

Full Name *

CREZDZ for Lithium-Ion Batteries

Scan the code *on your mobile phone* at www.credzid.com/scan for a simple example



- CREZDZ can be integrated into the manufacturing process of lithium-ion batteries.
- A fraud and tamperproof CREZDZ label is attached to each battery.
- Production records are linked to unique CREZDZ images at individual serial number level.
- Scanning the image will provide details of the certifications of the battery and if it complies with the laws of the Country, State, City
- Safety tips, YouTube videos and other content can be included
- Batteries can be automatically linked to owners at the serial number level for warranty and to enable future notifications
- Notifications allow direct contact with owners for product updates, recalls and reminders, such as battery expiry dates and safety tips
- A CREZDZ example has been set up using a Votexa battery – a quality Australian-owned company who do extensive testing.
- The screens are a quick mock-up and many more features are available

Safety Tips

- Buy certified authentic batteries and charges - not cheap uncertified batteries
- Follow manufacturer's instructions for charging
- Only charge your battery with the supplied charger
- Do not charge batteries near flammable materials.
- Turn off charger when the battery is charged - set a timer to remind yourself.
- Do not charge batteries unsupervised overnight.
- Do not charge a damaged battery

Certified

GIANT TWIST COMPATIBLE BICYCLE BATTERY 26 VOLT, 13AH & CHARGER

votexa

This Lithium-Ion Battery has been certified as genuine and complying with international and European Standards for battery cell safety, safety and quality manufacturing.

Votexa Giant Twist

Serial Number: 45210987

CERTIFICATIONS

- IEC 62133-2:2017** - 3rd ed. specification for lithium ion batteries
- CLC EN 50604-1:2018** - European Committee for Electrotechnical Standardization (CENELEC) standard for light electric vehicles
- CLC EN 61000-6-3:2007/A1:2011/AC:2012** - Electromagnetic compatibility (EMC) - Part 6: Immunity standards - Immunity to radio frequency electromagnetic interference and light-induced disturbances
- UN 38.3** - United Nations standard for safe transport of lithium ion batteries
- Material Safety Data Sheet** - Detailed specifications for safe transport of lithium ion batteries
- Directive 2014/53/EU of the European Parliament and of the Council** - Harmonisation of the laws of the Member States relating to wireless telephony equipment
- EN IEC 61000-3-2:2018** - Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions

Manufacturing Journey

- Manufactured** 15 January 2022 Jinhua City, China
- Shipped to UK** 22 January 2022 Ningbo, China
- Cleared UK Customs** 24 February 2022 London Container Terminal
- Distribution Centre** 27 February 2022 Bristol

Key Details

- Voltage** 26V
- Capacity** 13 Ah
- Charge Time** 6 hours for a full charge
- Power** 327 Wh
- Weight** 2.4 kg

Manufacturer Specification

Brand	-	votexa
Model	-	Giant Twist
Length	-	300 mm
Width	-	120 mm
Height	-	85 mm
Weight	-	250 kg
Voltage	-	26V
Capacity	-	13Ah
Power	-	327Wh
Charging Time	-	6 hours
Guarantee	-	2 years
Battery type	-	Lithium Ion

Compliance











- ✓ UK
- ✓ Europe
- ✓ USA
- ✓ Canada
- ✓ Australia/New Zealand

Learn More and Buy

Check Other Locations



Examples – Verifiable at serial number level with geolocation-based regulatory checks
Scan on your phone at www.credzid.com/scan

CREZ ID	eMobility Item	CREZ ID	eMobility Item
	Bike 43 eCargo Bike		BLVD URBN eScooter
	LODEN One eCargo Bike		Razor EcoSmart Cargo eScooter
	Heavy Haul Cargo eTrike		Pure Advance Electric Scooter
	Optima Car Battery		NIU KQi3 Max eScooter
	Votexa Giant Lithium-Ion Battery		SwiftYONE MARINE-e Scooter

About



Zipidi provides strategic consulting and insurance to the micromobility industry worldwide. We work with fleet operators, manufacturers, technology companies, governments, and many types of organisations.



About



CREDZ authenticates the credentials of any device, vehicle, battery or component and connects brands with customers in a trusted way. CREDZ builds on patented CSIRO technology commercialised with Australian start-up www.laava.id

