

Automated data sharing / verification solution for risk management of new, used and damaged battery shipments

79th SMDG Plenary Meeting - 3rd Apr 2025

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New, Used and Damaged Lithium Batteries

Deflagration and Lithium Battery Risk Exposure

In the event of deflagration

- Oxygen - not needed
- Heat - not needed
- **Fuel - the cell and/or the battery itself**



Fire triangle

To lower the risk of deflagration

- Risk = Likelihood x Impact
- Impact: deflagration event
- Decrease the likelihood:
 - Conduct technical analysis
 - Ship only with State of Charge below certain thresholds

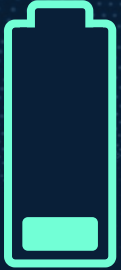


Image Source: www.firehouse.com

Current Situation

- IMDG code has no requirements for used, undamaged batteries (**only for new/damaged**)
- State of Health (SOH) in EU Battery Regulation Annex VII doesn't align with realistic parameters. Some of the industry stakeholders view **the approach as oversimplified**, failing to account for the complex performance characteristics and degradation patterns across different battery chemistries.
- Different lithium-ion battery chemistries like NCM (Nickel Cobalt Manganese) and LFP (Lithium Iron Phosphate) complicate the implementation of a "blanket solution" in battery technologies, **making a single universal approach impractical.**

SOC & SOH



SOC

State of Charge

- Measures the current battery capacity as a percentage of its maximum charge
- Similar to a fuel gauge in conventional vehicles
- Decreases during use
- Increases during charge
- Calculated using voltage, current and temperature measurements



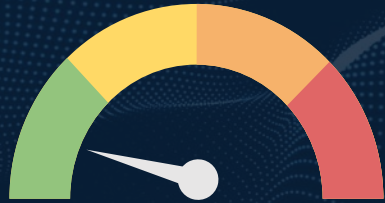
SOH

State of Health

- Measures battery's current maximum capacity compared to its original/factory capacity
- Indicates long-term battery degradation over time
- Decreases gradually over battery lifespan
- Used to estimate remaining battery life

Risk Level Associated with Used & Damaged Batteries

These levels must be declared by a “**technical expert**” of producer or authorized agent.



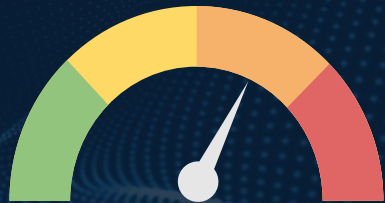
Level 1

Used,
still meeting UN38.3 criteria



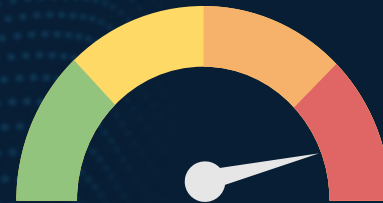
Level 2

Damaged,
still meeting UN38.3 criteria



Level 3

Damaged,
not meeting UN38.3 criteria



Level 4

Critically damaged,
not meeting UN38.3 criteria

Document requirements - under discussion process

		New Battery	Used Battery	Damaged Battery	Potential area for automated check
KYC	QMS	✓	✓	✓	Producer, Scope, Validity, ISO 17021-1 certified
	UN 38.3	✓	✓	✓	Producer, Scope, Validity, ISO 17025 certified
	MSDS	✓	✓	✓	Producer, UN, Class
	ERG	✓	✓	✓	Producer, UN, Class
Shipment Specific	DGD/CPC	✓	✓	✓	IMDG code 5.4.7, Info related to respective UN#
	SOH&SOC		✓	✓	Battery Serial#
	SP376			✓	Battery Serial#, SP376 Note A to F
	BL/eBL	✓	✓	✓	Traceable to test reports w/ the part# and/or serial#

Benefits of SOC & SOH for used battery and damaged battery



Additional tool for risk assessment* by both shippers and carriers.



Reduction of incidents based on the SOH analysis of the batteries (not mandatory in IMDG code).



Clear reference document to establish liability in case of incidents.

* Legal basis for SOH as declaration in EU Battery Regulation 2023/1542 Annex 14.4(b)

CDC booking document submission through a digital portal on GSBN

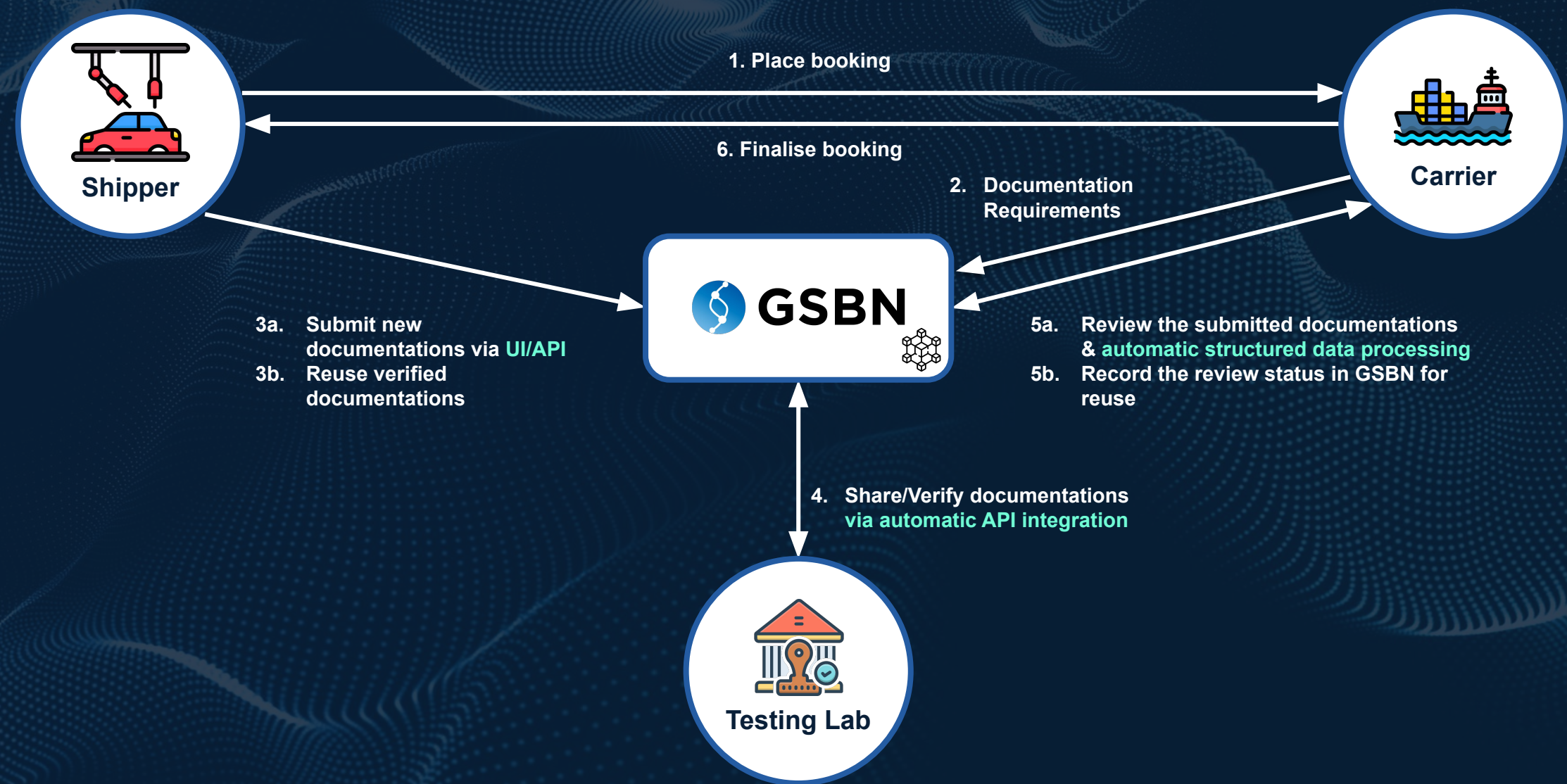
Scope of the pilot

Instead of using emails to submit documents, a major EV manufacturer (as shipper) has piloted with a major shipping line on the use of a digital portal to upload CDC documents on GSBN.

Benefits:

1. **Efficient** - shipper can reuse previously verified documents.
2. **Automation** - with structured data shared by labs, carriers can automate checking processes.
3. **Immutable** - documents are written on blockchain, thus are tamper-proof.
4. **Auditable** - the full life cycle of the documents from submission to verification are logged on blockchain/ this could be important for claims with P&I

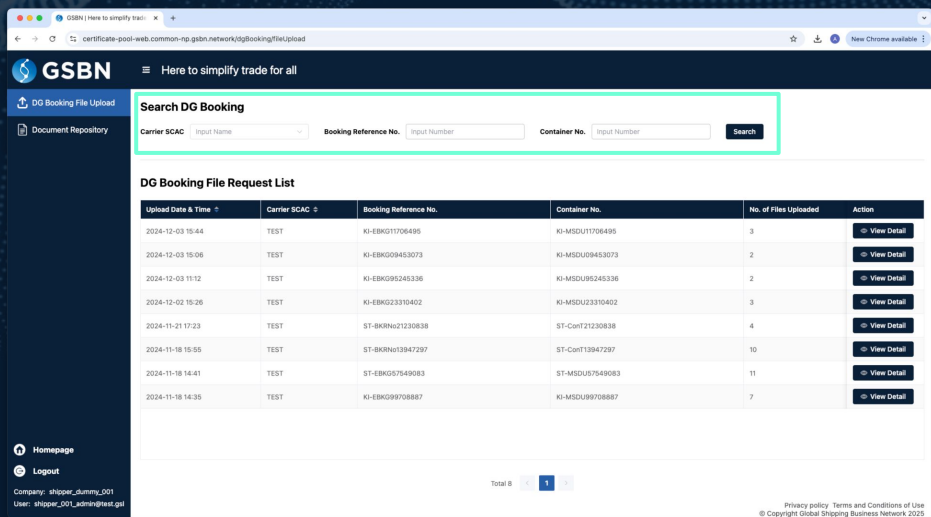
Document Submission Process



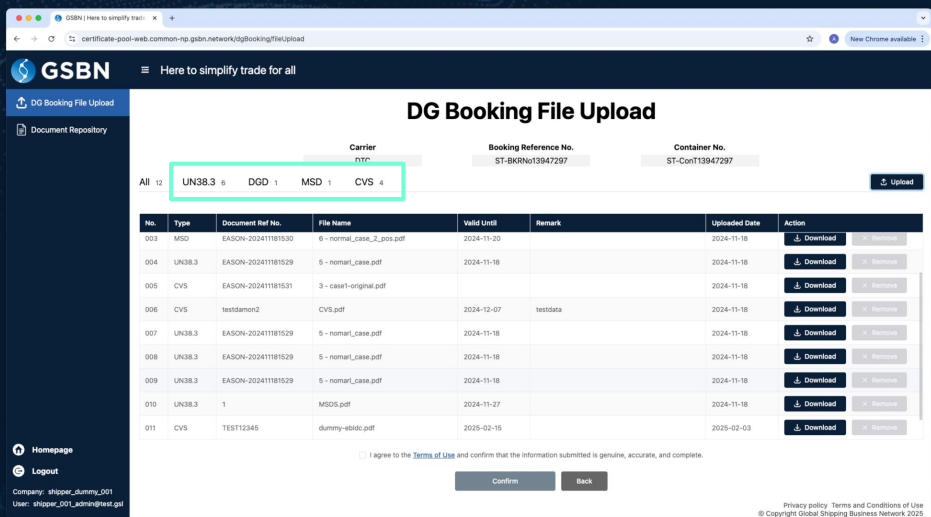
All transactions are protected by the GSBN blockchain platform to provide full traceability and auditability.

Document Submission UI for Shipper

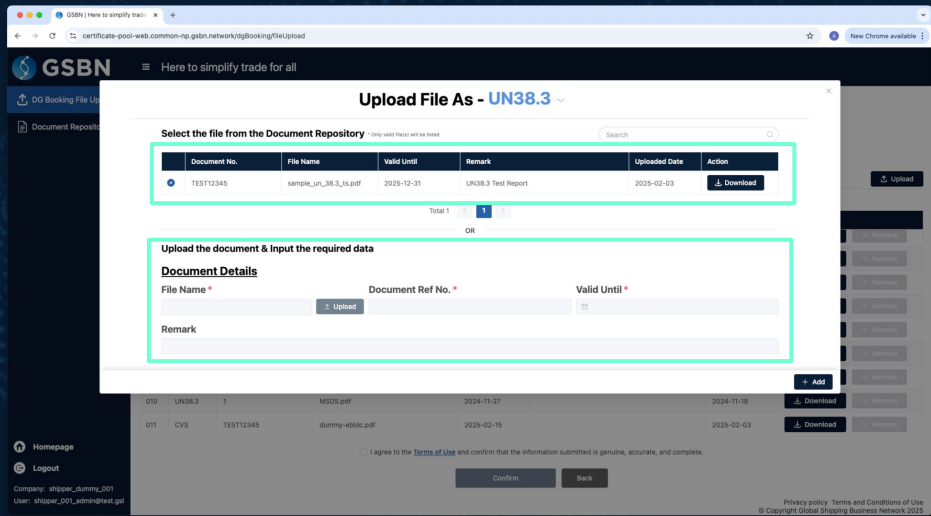
Search Booking & Booking List



Document Requirements for Booking



Document Selection / Upload

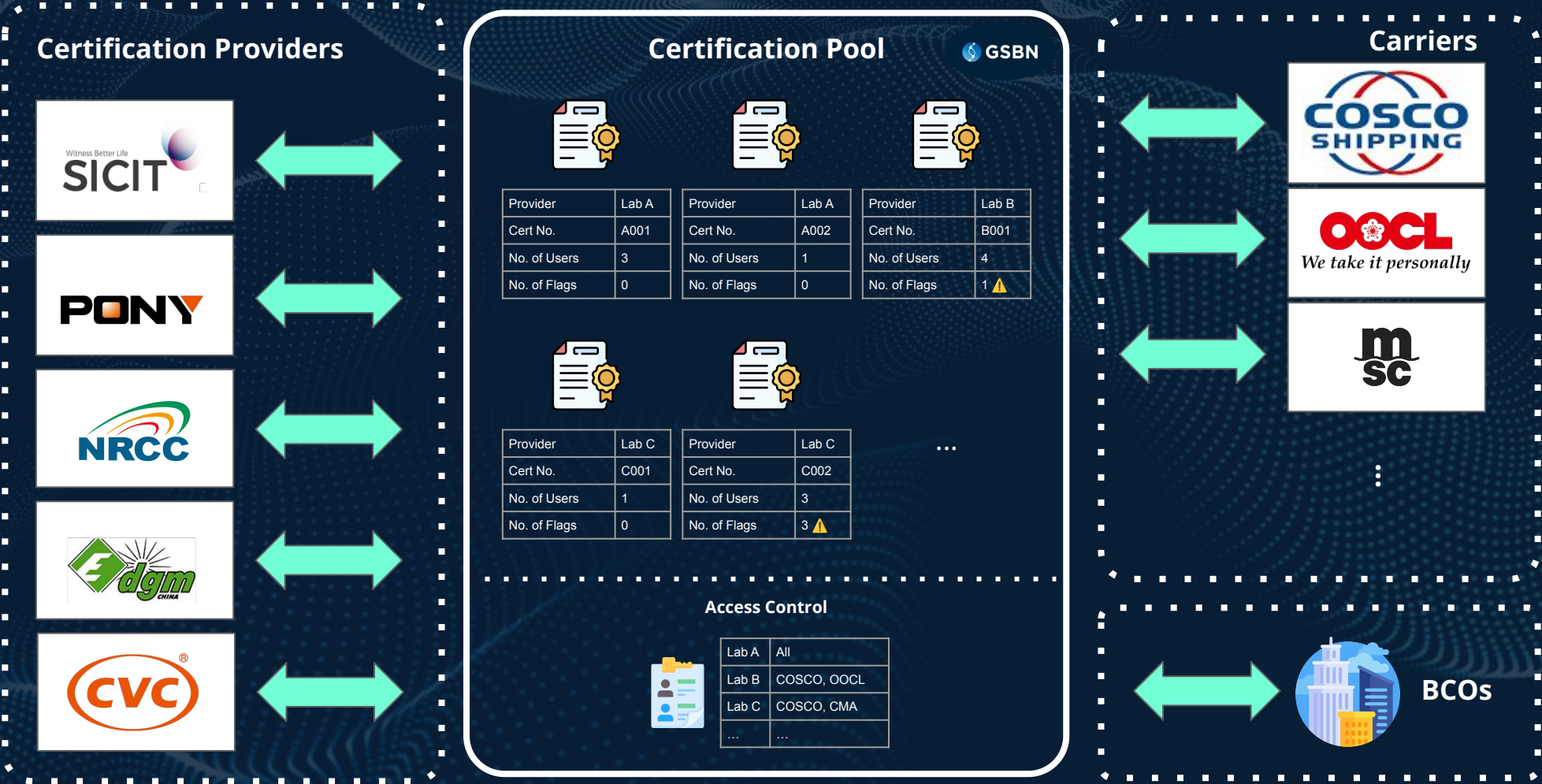


Key functionalities:

1. Shippers can search for DG booking created by carrier.
2. In each booking, carrier would have already outlined the required documents.
3. Shipper can select previously uploaded documents or upload new documents.

Certification Pool & Certificate Sharing between VSA Partners through GSBN

Certification Pool



Certification Pool can act as a **single source of truth** for stakeholders to record and share information about the certificates.

Certification Pool to Facilitate Sharing of Certificates

Shipper place a booking to the booking carrier



Booking carrier transfers the booking to a VSA partner for transport



Certification Pool to Facilitate Sharing of Certificates

	Create Time	IS FROM A...	CARRIER	SMAPLE N...	MANUFACT...	ENTRUST CODE MAIN	CUSTOMER FILE	DEPARTME...	E...	F...	REA...	S...	SUBMIT BY
	2024-09-25 08:...	Alliance	OOCL	锂离子电池 INR...	无锡市	21240020		无锡市			Real		ke I.C...
	2024-09-25 08:...	Alliance	EMC	真空吸尘器 227...	莱克电	21240011		莱克电			Real		zh co...
	2024-09-24 16:...	COSCO		锂离子电池扣...	深圳市	21240079		浙江荣			Real		yii I.C...
	2024-09-24 16:...	Alliance	CMA	锂离子电池扣式...	深圳市	MRIMT5BG		深圳市			Real		zh co...
	2024-09-24 16:...	Alliance	OOCL	吸尘器X7内含...	苏州斯	21240053		苏州斯			Real		zh co...
	2024-09-24 16:...	COSCO		HM活性炭	河南化	20240050		河南化			Real		ke I.C...
	2024-09-24 15:...	Alliance	ONE	挂脖风扇 (内...	宁波鼎	21240080		宁波鼎			Real		ke I.C...
	2024-09-24 15:...	Alliance	OOCL	锂离子二次电池...	江西程	21240000		江西程			Real		zh co...

- 1 Source of the Certificate
- 2 Product Name and Manufacturer
- 3 Certificate Number (Link to GSBN)
- 4 Related Certificates (such as MSDS, 38.3 Test Report, etc.)
- 5 Verification Results
- 6 Verifier (Verification History can also be kept for audit)

Certificate Details

Entrust Detail					
Entrust Code : 212400793126317		Effective Date : 2024-02-03		Expiry Date : 2025-01-01	
		Chinese		English	
Department Name:	浙江某信	Zhejiang		o... Ltd	
Manufacture Name:	深圳市某	SHENZ		DNICS CO.,LTD	
Sample Name:	锂离子电池式电芯CR2032 3.0V 230mAh 0.69Wh	Li-MnO2 Button Cell CR2032 3.0V 230mAh 0.69Wh			
Sample Name Alias:	/				
Sample Shape:	银色钮扣状金属外壳	Silvery Button metal shell			
Cargo Nature:					
Transport Type:	国际海事组织《国际海运危险货物规则》（2022版）IMO International Maritime Dangerous Goods Code (2022 Edition)				
Business Category:	运输危险品-锂电池		0102		
Lithium Battery Test Summary:	Net Weight : 1.505	Lithium Content : 0.063	Net Weight : 1.505	Lithium Content : 0.063	
	Capacity : 230mAh	Voltage : 3	Capacity : 230mAh	Voltage : 3	
Conclusion:	[packagingRequirements=无。None。 , hazardsIdentification=锂离子电池。Lithium metal battery。 , suggestionAccordingToIMOIMDGCode=根据特殊规定188。该物品不受IMO IMDG Code其他条款限制。The article is not subject to other provisions of IMO IMDG Code according to special provision 188.]		[packagingRequirements=无。None。 , hazardsIdentification=锂离子电池。Lithium metal battery。 , suggestionAccordingToIMOIMDGCode=根据特殊规定188。该物品不受IMO IMDG Code其他条款限制。The article is not subject to other provisions of IMO IMDG Code according to special provision 188.]		
	Edit				

Q&A