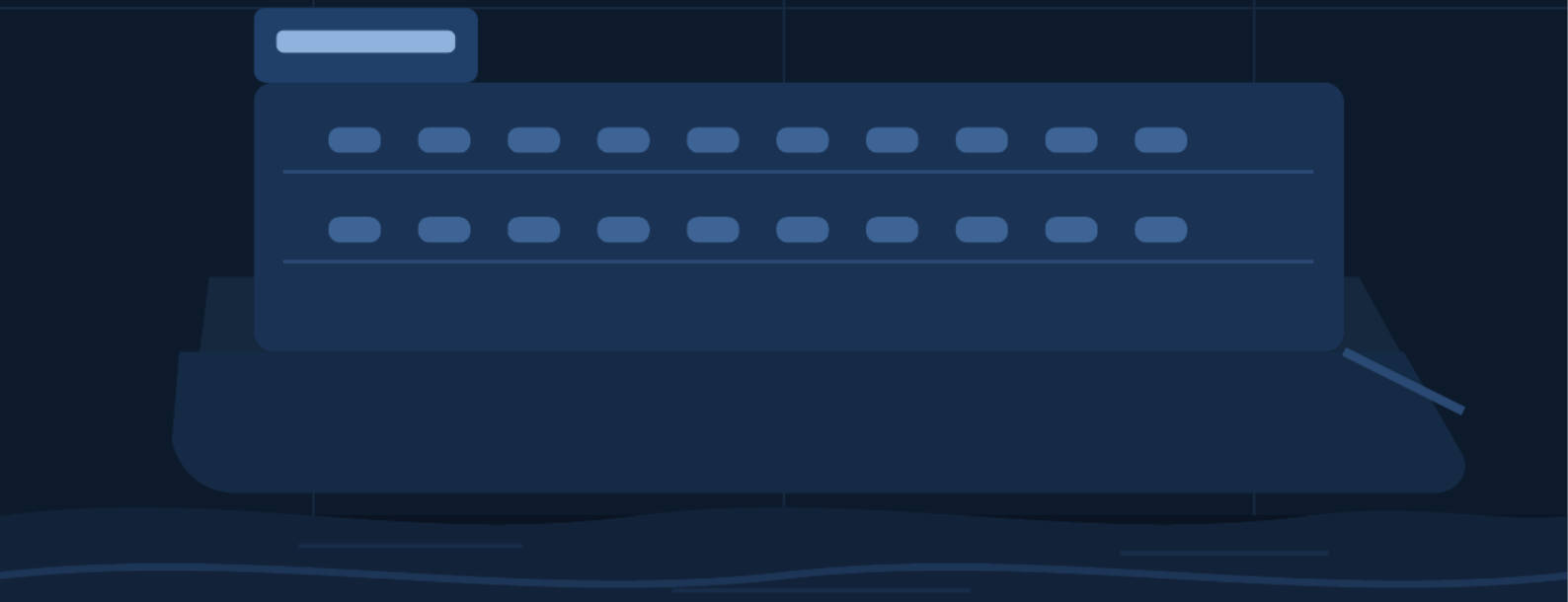
MARITIME DANGEROUS GOODS REFERENCE

Shipping Vehicles Under IMDG Code Amendment 42-24

Classification, State of Charge & Carrier Policy — from diesel and petrol to hydrogen fuel cells, lithium-ion, lithium-metal and sodium-ion battery vehicles.

UN 3166 · UN 3171 · UN 3556 · UN 3557 · UN 3558



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Shipping Vehicles Under IMDG Code Amendment 42-24: Classification, State of Charge & Carrier Policy

Forward

Vehicles are one of the more misunderstood commodities under the IMDG Code. A diesel car, a hydrogen fuel-cell bus and a battery electric vehicle all travel under the same broad heading of "vehicle," yet each is governed by a different UN number, a different Special Provision, and - in practice - a different set of carrier and terminal requirements layered on top of the Code text. Amendment 42-24 sharpened this picture further by splitting lithium-ion, lithium-metal and the new sodium-ion battery vehicles into their own UN entries (3556, 3557 and 3558), separate from the long-standing UN 3171 BATTERY-POWERED VEHICLE entry.

This reference brings together four things a shipper, freight forwarder or DG officer needs side by side: how each vehicle type is classified and exempted under Special Provisions 961 and 962; how hybrid vehicles with an installed lithium battery are routed; what individual carriers such as CMA CGM, Wallenius Wilhelmsen/EUKOR and the EMSA-led industry guidance actually require in practice around battery state of charge and placarding; and the primary sources each of those figures is drawn from, so every claim here can be checked against its original document.

1. Vehicle Classification Under IMDG Code Amendment 42-24

The table below follows the structure of IMDG Code Special Provisions 961 and 962: SP 961.1 covers vehicles carried in genuine Ro-Ro spaces; SP 961.2 to SP 961.6 cover specific exemptions for vehicles on conventional or container vessels; and SP 962 sets out what applies once none of the SP 961 exemptions are met.

UN 3166 - Flammable Liquid Fuel (flashpoint of 38°C or above) **Shipping Name: VEHICLE, FLAMMABLE LIQUID POWERED**	
Examples	Diesel-powered passenger cars, diesel commercial trucks, heavy diesel-electric railway locomotives, diesel-powered agricultural tractors, diesel excavators/construction equipment, and diesel hybrid vehicles.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Exempt if stowed in a certified vehicle/Ro-Ro space or weather deck; zero signs of fuel or battery leakage. For hybrid variants with lithium batteries, the batteries must meet §2.9.4 criteria.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	NOT SUBJECT TO THE CODE if there are no leaks in any portion of the fuel system, the fuel tank contains ≤ 450 Litres, and installed batteries are protected from short-circuit (SP 961.2).
Hazardous - SP 962	Assigned to Class 9 if SP 961 conditions are not met. Fuel tank containing the flammable liquid must not be more than one-fourth full and cannot exceed 250 L. Batteries must be isolated.

UN 3166 - Flammable Liquid Fuel (flashpoint less than 38°C) **Shipping Name: VEHICLE, FLAMMABLE LIQUID POWERED**	
Examples	Standard petrol/gasoline passenger cars, petrol-propelled motorcycles, gasoline-powered riding lawn tractors, and light aviation gas-powered aircraft.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Exempt if stowed in a certified vehicle/Ro-Ro space or weather deck; zero signs of fuel or battery leakage. For hybrid variants with lithium batteries, the batteries must meet §2.9.4 criteria.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	NOT SUBJECT TO THE CODE ONLY IF the fuel tank is completely empty and drained so that the vehicle cannot be operated (SP 961.3). Fuel lines, filters, and injectors do not need to be cleaned/purged. Batteries protected from short-circuit.
Hazardous - SP 962	Assigned to Class 9 if SP 961 conditions are not met. Fuel tank containing the flammable liquid must not be more than one-fourth full and cannot exceed 250 L. Fuel lines must be secure; batteries isolated.

UN 3166 - Flammable Gas (Liquefied or Compressed)

Shipping Name: VEHICLE, FLAMMABLE GAS POWERED

Examples	Compressed Natural Gas (CNG) municipal buses, Liquefied Petroleum Gas (LPG) urban delivery vans, Liquefied Natural Gas (LNG) long-haul freight trucks, hydrogen internal combustion engine (ICE) cars, and dual-fuel fleet vehicles.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Exempt if stowed in a certified vehicle/Ro-Ro space or weather deck; zero signs of gas or battery leakage. Hybrid variants containing lithium batteries must meet §2.9.4 criteria.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	NOT SUBJECT TO THE CODE ONLY IF the gas fuel tanks are completely empty, the positive internal pressure does not exceed 2 bar, the fuel shut-off/isolation valve is closed and secured (SP 961.4).
Hazardous - SP 962	Assigned to Class 9 if SP 961 conditions are not met. The fuel shut-off valve of the fuel tank(s) shall be securely closed. Batteries must be protected.

UN 3166 - Fuel Cell operating on Flammable Liquid

Shipping Name: VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED

Examples	Direct Methanol fuel cell utility vehicles, experimental liquid-alcohol fuel cell research apparatus, and specialized logistics tugs powered by methanol fuel cells.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Stowed on a vehicle/Ro-Ro space or weather deck with no signs of leakage from the fuel cell system, fuel tank, or battery.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	Follows liquid fuel criteria based on flashpoint: SP 961.2 applies if flashpoint is 38°C or above + 450 L tank; SP 961.3 applies if flashpoint is < 38°C (must be empty and drained).
Hazardous - SP 962	Fuel cell systems and fuel tanks must show no signs of leakage. Liquid volume caps apply (≤ 1/4 full and ≤ 250 L); batteries must be short-circuit protected.

UN 3166 - Fuel Cell operating on Flammable Gas

Shipping Name: VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED

Examples	Hydrogen fuel cell production cars (e.g., Toyota Mirai, Hyundai Nexo), hydrogen fuel cell transit buses, and hydrogen fuel cell material handling equipment.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Stowed on a vehicle/Ro-Ro space or weather deck with no signs of leakage from the hydrogen cylinders, fuel cells, or battery.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	NOT SUBJECT TO THE CODE ONLY IF the gas fuel cell tanks are completely empty, internal cylinder pressure does not exceed 2 bar, and the fuel shut-off/isolation valve is securely closed (SP 961.4).
Hazardous - SP 962	The gas fuel shut-off valve of the fuel cell system must be securely and tightly closed. Installed batteries must be fully protected from short circuit and damage.

UN 3171 - Wet cell (lead-acid) batteries, sodium metal or sodium alloy batteries [1] Shipping Name: BATTERY-POWERED VEHICLE	
Examples	Conventional warehouse electric forklifts equipped with wet traction batteries, standard commercial golf carts, baggage handling tractors using traditional flooded lead-acid batteries, and specialized heavy machinery powered by molten-sodium metal batteries.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Vehicles stowed on a vehicle/special category/Ro-Ro space or weather deck, with zero signs of battery leakage (SP 961.1).
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	Vehicles solely powered by a wet or dry electric storage battery or a sodium battery, with the battery protected from short circuit (SP 961.5).
Hazardous - SP 962	Required if shipped containerized on conventional container ships. Installed batteries must be securely protected from damage, short circuit, and accidental activation.

UN 3556 - Lithium-ion battery pack Shipping Name: VEHICLE, LITHIUM ION BATTERY POWERED	
Examples	Standard Battery Electric Vehicles (BEVs), Plug-in Hybrid Electric Vehicles (PHEVs), electric logistics delivery vans, high-performance electric motorcycles, e-bikes (pedal cycles with an electric motor), stand-up e-scooters, hoverboards, and lithium-powered motorized wheelchairs.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Vehicles stowed on a vehicle/special category/Ro-Ro space or weather deck; driven on/off on their own wheels; no battery leakage; lithium batteries must meet section 2.9.4 criteria.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	NONE / NOT APPLICABLE. (Lithium-ion vehicles inside a container or on conventional decks cannot be exempted from the Code under SP 961).
Hazardous - SP 962	FULLY REGULATED CLASS 9. Installed batteries shall meet the provisions of SP388 or SP977, as applicable, and be protected from damage, short circuit, and accidental activation during transport.
Carrier Policy & Port Reality Overrides	State of Charge (SoC): Not mandated by IMDG Code text for vehicles. RoRo/PCTC carriers and terminals commonly apply a 20%-50% SoC window during transport - see Wallenius Wilhelmsen/EUKOR, EMSA's AFV Guidance and the UECC Electric Vehicle Guideline (Sources & Verification Notes, refs 1-3). Placarding: The IMDG Code text does not require Class 9 placards on an unpackaged vehicle container under SP 962. Placarding practice varies by carrier and terminal; shippers should confirm requirements directly with their carrier before booking, as no primary source setting this as a general rule was found.

UN 3557 - Lithium-metal battery pack Shipping Name: VEHICLE, LITHIUM METAL BATTERY POWERED	
Examples	Deep-sea unmanned research rovers, non-rechargeable military or aerospace prototype transport craft, and autonomous exploratory remote vehicles powered by high-capacity primary lithium-metal packs.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Vehicles stowed on a vehicle/special category/Ro-Ro space or weather deck; driven on/off on their own wheels; no battery leakage; lithium batteries must meet section 2.9.4 criteria.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	NONE / NOT APPLICABLE. (Lithium-metal vehicles inside a container or on conventional decks cannot be exempted from the Code under SP 961).
Hazardous - SP 962	FULLY REGULATED CLASS 9. Installed batteries shall meet the provisions of SP388 or SP977, as applicable, and be protected from damage, short circuit, and accidental activation during transport.
Carrier Policy & Port Reality Overrides	State of Charge (SoC): Not mandated by IMDG Code text for vehicles. RoRo/PCTC carriers and terminals commonly apply a 20%-50% SoC window during transport - see Wallenius Wilhelmsen/EUKOR, EMSA's AFV Guidance and the UECC Electric Vehicle Guideline (Sources & Verification Notes, refs 1-3). Placarding: The IMDG Code text does not require Class 9 placards on an unpackaged vehicle container under SP 962. Placarding practice varies by carrier and terminal; shippers should confirm requirements directly with their carrier before booking, as no primary source setting this as a general rule was found.

UN 3558 - Sodium-ion battery pack Shipping Name: VEHICLE, SODIUM ION BATTERY POWERED	
Examples	Emerging market urban commuter electric vehicles, sodium-ion budget utility delivery buggies, and next-generation eco-scooters utilizing organic alternative electrolytes.
Ro-Ro vessels / related cargo spaces (SP 961.1)	Vehicles stowed on a vehicle/special category/Ro-Ro space or weather deck; no battery leakage; sodium-ion batteries must meet section 2.9.5 criteria.
Non Ro-Ro vehicle deck, conventional & container vessels (SP 961.2-.6)	EXEMPT ONLY IF the sodium-ion battery is completely short-circuited to eliminate all electrical energy, and this is easily identifiable (e.g., via a visible busbar between terminals) (SP 961.6).
Hazardous - SP 962	Assigned to Class 9 under SP 962 if the vehicle is live (not short-circuited) and shipped inside a container or on conventional decks. Batteries must be protected and comply with 2.9.5.

Note 1 - UN 3171 sodium metal/alloy qualifier: Special Provision 961.5 refers only to a vehicle "solely powered by a wet or dry electric storage battery or a sodium battery" - it does not itself use the words "metal" or "alloy." This ebook labels UN 3171 as covering sodium METAL/ALLOY batteries to distinguish it from the separate rechargeable sodium-ION battery entry (UN 3558, SP 961.6) introduced in Amendment 42-24. This is an editorial clarification for reader clarity, not verbatim Code wording.

2. Classification Rules for Hybrid-Lithium Battery Vehicles

Regulatory routing (IMDG Code text)

Hybrid electric vehicles powered by both an internal combustion engine and a lithium battery pack are classified under UN 3166 entries (VEHICLE, FLAMMABLE LIQUID POWERED or VEHICLE, FLAMMABLE GAS POWERED), not under UN 3556. Their installed lithium batteries are required to satisfy the safety criteria of section 2.9.4.

Commercial policies & port realities override

The literal text of the IMDG Code does not mandate an SoC limit or container placarding for UN 3166 unpackaged vehicle containers. Individual carrier commercial policies may extend their lithium-ion safety protocols to hybrid vehicles, and some carriers apply a traction battery State of Charge (SoC) within the 20%-50% industry range used for BEVs (Sources & Verification Notes, refs 1-3), along with Class 9 placards on all four sides of the container if the hybrid vehicle carries a high-capacity lithium battery pack. Shippers should confirm requirements with their line prior to booking.

3. Carrier and Port Policy: Where Practice Goes Further Than the Code

The IMDG Code sets the regulatory floor. In practice, individual carriers, terminal operators and industry bodies apply additional operational requirements - most visibly around lithium battery state of charge - that shippers need to know about separately from the Code itself.

Deep-Sea Container Shipping Lines (e.g., CMA CGM)

CMA CGM requires that all electric and hybrid vehicles be declared as dangerous goods on every bill of lading, even where IMDG Code Special Provision 961 or 971 would otherwise permit a non-dangerous declaration. A signed Letter of Indemnity (LOI) is mandatory for each shipment, under which the shipper certifies the battery state of charge has been adjusted to safely withstand the sea voyage, confirms the vehicle is undamaged and less than 7 years old, and accepts responsibility for the choice of container transport unit (CTU).

Source: https://www.cma-cgm.com/assets/public/pdf/022-%20specific%20shipment%20-%20Loading%20Electric%20and%20Hybrid%20cars%2016-1-2023.pdf

Shippers must sign the LOI confirming the SoC is suitable for the voyage duration (CMA CGM does not publish a fixed percentage) and that any batteries can withstand temperatures up to 60°C. EV/HEV containers must be stowed on deck only, kept at least 6 metres from other dangerous goods containers in all directions, and block stowage of two EV/HEV containers together in the same bay is prohibited. Damaged vehicles, vehicles over 7 years old, and partner bookings of EV/HEV are refused outright.

Specialized Roll-on/Roll-off Carriers (e.g., Wallenius Wilhelmsen / EUKOR)

High-voltage (HV) batteries must be presented with a maximum state of charge (SoC) of 50%, applying equally to Battery Electric Vehicles (BEVs) and Plug-in Hybrid Electric Vehicles (PHEVs). Charging above 50% (up to 70%) is possible only with prior notice to the Wallenius Wilhelmsen representative. Lithium-ion batteries must have passed the pressure, temperature, crush and impact tests defined in the UN 38.3 test criteria.

Source: https://www.eukor.com/news/electric-vehicles-101-frequently-asked-questions

New customers complete an Alternative Fuel Vehicle questionnaire and declare the EV model/type at booking. Vehicles are accepted for transit only if clean, fully functional, self-propelled, safe to drive, damage-free and at the correct charging level, confirmed through Wallenius Wilhelmsen's pre-delivery inspection. Vehicles with damaged or defective lithium batteries are not accepted for loading. Vehicles meeting IMDG Special Provision 961 are not booked as dangerous goods; vehicles that do not meet SP 961 are classified and booked as DG under the IMDG Code.

Association of European Vehicle Logistics (ECG)

Following publication of the EMSA AFV Guidance, ECG surveyed OEMs and shipping lines on the state of charge at which Battery Electric Vehicles (BEVs) leave European factories and are transported, and publishes the results as a reference table on its website.

Source: https://www.ecgassociation.eu/publications-and-reports/ev-soc-requirements/

Shippers and OEMs can consult the ECG survey to see how individual carriers and manufacturers have applied the EMSA 20%-50% SoC guidance in practice. ECG publishes the data for general information only and advises shippers to confirm current requirements directly with each carrier or OEM before relying on it.

European Maritime Safety Agency (EMSA) Framework

EMSA's Guidance for Alternative Fuel Vehicles (AFVs) in Ro-Ro Spaces recommends that vehicles carried on ro-ro cargo ships and vehicle carriers (PCTCs) display a state of charge between 20% (floor) and 50% (ceiling). A SoC below roughly 30% is noted to make thermal runaway unlikely; the 20% floor is set to preserve enough charge for port dwell time and loading/discharge operations, while the 50% ceiling limits the energy available to fuel a battery fire.

Source: https://www.emsa.europa.eu/publications/reports/download/8189/4729/23.html

This is guidance addressed to flag States, port States, shipowners and operators - it is advisory, not a mandatory IMO regulation, though many carriers have adopted its SoC recommendation commercially. The guidance (last updated April 2025) still refers to electric vehicles under the pre-Amendment-42-24 entry UN 3171 BATTERY-POWERED VEHICLE, and has not yet been updated to reference the newer UN 3556/3557/3558 entries.

On port authority regulation specifically: no independent port authority (government/statutory) regulation mandating a specific vehicle SoC percentage or container placarding rule was identified during research for this ebook. Every SoC or placarding practice above is carrier or terminal-operator policy, not port authority law, and can vary by trade lane.

4. Sources & Verification Notes

Every figure in this ebook is drawn from one of the primary sources below.

Ref #	Topic / Source	Original Source URL
1	State of Charge (SoC) industry range - Wallenius Wilhelmsen / EUKOR - Electric Vehicles 101 FAQ	https://www.eukor.com/news/electric-vehicles-101-frequently-asked-questions
2	State of Charge (SoC) industry range - EMSA - Guidance for Alternative Fuel Vehicles (AFVs) in Ro-Ro Spaces	https://www.emsa.europa.eu/publications/reports/download/8189/4729/23.html
3	State of Charge (SoC) industry range - UECC - Electric Vehicle Guideline v1	https://uecc.com/wp-content/uploads/2026/01/uecc-electric-vehicle-carriage.pdf
4	Carrier commodity policy cross-check - Maersk - Requirements for Booking Vehicles	https://www.maersk.com/news/articles/2021/11/02/requirements-for-booking-vehicles
5	OEM/carrier SoC adoption survey - ECG Association - EV SoC Requirements	https://www.ecgassociation.eu/publications-and-reports/ev-soc-requirements/
6	CMA CGM EV/HEV booking policy - CMA CGM - Specific Shipment: Loading Electric and Hybrid Cars	https://www.cma-cgm.com/assets/public/pdf/022-%20specific%20shipment%20-%20Loading%20Electric%20and%20Hybrid%20cars%2016-1-2023.pdf

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In This Reference

One broad word — “vehicle” — hides seven distinct regulatory pathways under the IMDG Code. This ebook maps each of them, entry by entry: diesel, petrol and gas-powered vehicles under UN 3166; fuel-cell vehicles running on flammable liquids and gases; lead-acid and sodium-metal battery vehicles under UN 3171; and the new Amendment 42-24 entries for lithium-ion (UN 3556), lithium-metal (UN 3557) and sodium-ion (UN 3558) battery vehicles.

For every entry, the same four questions are answered side by side: when SP 961 exempts the vehicle on a Ro-Ro deck, when it escapes the Code on conventional and container vessels, what SP 962 demands once it is regulated as Class 9, and — crucially — where carrier and terminal practice goes further than the Code, from CMA CGM’s Letter of Indemnity regime to the 20%–50% state-of-charge window applied across the Ro-Ro trades. Every figure is traceable to a cited primary source.

About the Author

Shashi Kallada has dedicated 36 years to the Merchant Shipping industry, specializing profoundly in the IMDG Code over the last 23 years. As an experienced ex-sailor, he provides consulting, advisory, and high-level training architectures to maritime transport organizations globally, bridging regulatory frameworks with operational realities at sea.