

Directorate General of Shipping

Export Packaging for Safe Transportation of Dangerous Goods by Air & Sea

9th January 2026



India's Maritime Trade Imperative



India and Maritime Trade

95%

By trade volume

70%

By trade value

12

Major Ports

200+

Non-Major Ports

11,098 km

Total length of India's coastline

Maritime trade is central to India's ambition of becoming a USD 30 trillion economy by 2047

India's Policy and Vision Alignment



Viksit Bharat @2047 & Atmanirbhar Bharat drive export-led growth and logistics efficiency



Maritime India Vision 2030 sets the roadmap for ports, shipping and safety.



Union Budget 2025 strengthened the sector with a **₹25,000 crore Maritime Development Fund**.

As trade volumes rise, **risk exposure rises proportionately**, particularly for dangerous goods

Export Growth Across Dangerous Goods Sensitive Cargo



Total Merchandise Exports

US\$ 184.13bn

(Apr–Aug 2025)

+2.52%
YoY

Total Exports Petroleum Products

US\$ 4.48 bn

(Aug 2025)

+6.54%
YoY

Total Exports Electronic Goods

US\$ 2.93 bn

(Aug 2025)

+25.93%
YoY

Total Exports Organic & Inorganic Chemicals

US\$ 2.51 bn

(Aug 2025)

+6.94%
YoY

Where the major drivers of merchandise exports growth include **Electronic Goods**, Engineering Goods, Gems & Jewellery, **Petroleum Products** and **Drugs & Pharmaceuticals**

Regulatory Compliance & Packaging Standards for Dangerous Goods (DG)



Parallel Increase in Dangerous Goods Movement

- ▶ Expanding exports in electronics, chemicals, pharmaceuticals and energy are driving a parallel increase in DG movement, including embedded DG cargo.



Robust Regulatory Alignment

- ▶ under the IMDG Code, Aircraft (Carriage of Dangerous Goods) Rules, 2025 and IATA DGR (2025) is critical to managing emerging DG risks, particularly batteries.



Certified, IMDG-compliant packaging

- ▶ supported by national standards such as BIS IS 18149:2023 ensure uniform requirements for DG classification, packaging, marking, handling and emergency preparedness

Overview of Recent Marine Incidents



May 2025: MSC Elsa 3, containing hazardous chemicals, capsized off the shore of Kochi



July 2024: Major Fire erupted on a merchant ship MV Maersk Frankfurt off the Karnataka coast



June 2025: INTERASIA TENACITY, Lithium-ion container fire off Kerala safely contained through rapid multi-agency response



June 2025: Major Fire broke out on Wan Hai 503 near Kerala, raising fears of a hazardous oil spill and environmental disaster.

International Maritime Dangerous Goods (IMDG) Code: Legal Framework



SOLAS Convention, 1974 (as amended)

- Chapter VII governs the carriage of dangerous goods in packaged form
- IMDG Code is an extension of SOLAS Chapter VII

MARPOL Convention (1973/78)

- Annex III regulates prevention of pollution by harmful substances in packaged form
- Carriage permitted only in accordance with MARPOL Annex III
- Detailed requirements extended through the IMDG Code

IMDG Code

- International code for safe transport of dangerous goods by sea
- Addresses safety of life, ship, and environment
- Covers the full lifecycle: classification, packing, stowage, segregation, and emergency response

IMDG Code – Scope, Mandatory Status & Continuous Evolution



► Developed as an international code for safe maritime transport of dangerous goods in packaged form

Covers detailed requirements for:

- Classification
- Packing and packaging
- Container traffic
- Stowage and segregation of incompatible substances
- Prevention of pollution

Initially adopted in 1965 as a recommendatory instrument

- Granted mandatory status under SOLAS from 1 January 2004
- Adopted by IMO Assembly Resolution A.716(17)

Certain provisions of the Code remain recommendatory, including:

- Training requirements, Security provisions (except 1.4.1.1) Segregation flow charts and examples, Incident and fire precaution guidance

Amendments are made on a two-year cycle

- Proposals by IMO Member Governments
- Alignment with UN Recommendations on the Transport of Dangerous Goods

Enables IMO to respond efficiently to emerging cargo risks and transport developments

Carriage of Dangerous Goods: Packaging Certification by DGS



Packaging Certification Regime – Indian Regulatory Framework

Governed by

- SOLAS Chapter VII
- IMDG Code
- Merchant Shipping (Carriage of Cargo) Rules, 1995

Cargo Circular NT-CRG-01/03 (24 Nov 2003)

- DG Shipping delegated testing and certification to:
- Indian Institute of Packaging (IIP)
 - Centres at Mumbai, Chennai & Kolkata
 - In operation since November 1997

Self-Certification Provision

- Introduced to support industry growth and exports
- Permitted for manufacturers meeting criteria in Annex I
- Operates alongside IIP certification

IMDG Code: Classification of Dangerous Goods



Class	Nature of Hazard	Typical Examples
1	Explosives	Ammunition, fireworks
2	Gases	LPG, refrigerant gases
3	Flammable liquids	Petrol, solvents
4	Flammable solids	Sulphur, matches
5	Oxidizers & peroxides	Ammonium nitrate
6	Toxic & infectious	Pesticides
7	Radioactive	Medical isotopes
8	Corrosives	Acids, alkalis
9	Miscellaneous	Lithium batteries

DANGEROUS GOODS CLASSES			
CLASS 1 Explosives eg. TNT		CLASS 4.3 Dangerous when wet eg. Calcium Carbide	
CLASS 2.1 Flammable Gases eg. Acetylene		CLASS 5.1 Oxidising Substances eg. Silver Nitrate	
CLASS 2.2 Non-Flammable Non-Toxic Gases eg. Nitrogen		CLASS 5.2 Organic Peroxides eg. Methyl Ethyl Ketone Peroxide	
CLASS 2.3 Toxic Gases eg. Chlorine		CLASS 6 Toxic Substances eg. Sodium Cyanide	
CLASS 3 Flammable Liquids eg. Petrol		CLASS 7 Radioactive Substances eg. Uranium	
CLASS 4.1 Flammable Solids eg. Sulfur		CLASS 8 Corrosive Substances eg. Hydrochloric Acid	
CLASS 4.2 Spontaneously Combustible Substances eg. Zinc Dust		CLASS 9 Miscellaneous eg. Asbestos	
DANGEROUS GOODS PACKING GROUPS PACKING GROUP I GREAT DANGER PACKING GROUP II MEDIUM DANGER PACKING GROUP III MINOR DANGER			

Approval of IMDG Dangerous Goods Packaging Test Centres



IMDG Code Requirements

Chapter 4.1: All packaging, including IBCs and large packaging's, must:

- Conform to approved design type
- Be successfully tested

Part 6 of IMDG Code:

- Construction
- Testing
- Approval of packaging for IMDG cargo

Role of IMDG Packaging Test Centres

- Testing of packaging type, material, and performance
- Certification of compliance as per IMDG Code
- Certificates issued after successful testing

Approval Process (India)

- Organisations may apply to be approved as IMDG Packaging Test Centres
- Inspection and approval as per Inspection Scrutiny Sheet (Annexure-I)
- Inspection conducted by Jurisdictional Mercantile Marine Department (MMD)
- Inspection fee charged as per DGS Circular No. 13 of 2010

Implementation

- MS Notice effective immediately
- Issued with approval of the Director General of Shipping & Secretary to Government of India

Major Maritime Incidents

MSC ELSA 3 – Sinking of MSC ELSA 3

Why the Incident Happened

- The vessel started listing and subsequently sank approximately 13 NM off the Kerala coast. While the immediate cause was loss of stability, the severity of the incident escalated due to the nature of cargo onboard.

These cargoes included:

13 IMDG containers, having Class 4.3 – Calcium Carbide (water-reactive),
Class 9 – Environmentally hazardous cargo (including nurdles)

IMDG Linkage :

- Class 4.3 cargo reacts with water, generating flammable gases
- Class 9 cargo caused large-scale shoreline pollution
- IMDG Code focuses on safe carriage; post-casualty containment failure exposed limitations



Major Maritime Incidents

INTERASIA TENACITY

Why the Incident Happened

The vessel was carrying Lead Acid batteries and Lithium-ion batteries, which are dangerous goods under the IMDG Code.

These cargoes were:

- Not declared in the Dangerous Goods Manifest
- Not reflected in the special list or stowage plan

IMDG Code Violations:

- Chapter 5.4 – Mandatory documentation & DG manifest
- Chapter 7.1 / 7.2 – Stowage & segregation requirements
- Chapter 1.4 – Security and awareness provisions
- Class 8 & Class 9 cargo not treated as DG at all



Major Maritime Incidents

MAERSK FRANKFURT – Fire on Board

Why the Incident Happened

- Fire originated in container bays carrying DG cargo
- Smoke spread indicated multiple adjacent containers affected

Likely contributors:

- Incorrect or incomplete DG declaration
- Inadequate segregation of incompatible cargo
- Under-deck stowage of fire-prone DG cargo

IMDG Code Linkage:

- Chapter 7.2 – Segregation of incompatible substances
- Dangerous Goods List (DGL) – Stowage category not respected
- Chapter 7.8 – Special requirements during fire involving DG cargo



Major Maritime Incidents

Explosion on WAN HAI 503

Why the Incident Happened

- Explosion originated from under-deck cargo hold
- Vessel was carrying 143 IMDG containers across Classes 3, 4.1, 4.2, 4.3, 6.1, 8 & 9.

Under-deck concentration of:

- Flammable liquids
- Water-reactive substances
- Spontaneously combustible cargo

IMDG Code Failures

- Improper segregation between incompatible classes
- Under-deck stowage of highly reactive cargo



Preventive Measures for Safe Carriage of Dangerous Goods



Correct IMDG Classification & Declaration

- Accurate labeling of dangerous goods
- Proper hazard documentation



Proper Packing & Container Stuffing

- Approved packaging standards
- Secured & cushioned cargo



IMDG-Compliant Stowage Plans

- Safe stowage arrangements
- Compliance with IMDG code



Strict Segregation of Incompatible Cargo

- Separate incompatible substances
- Maintain safe distances



Prefer On-Deck Stowage for High-Risk DG Cargo

- Quick access & monitoring
- Reduce risk of internal fire spread

An aerial photograph of a large container ship docked at a port. The ship's deck is densely packed with multi-colored shipping containers in shades of red, orange, yellow, green, and blue. Several yellow gantry cranes are positioned along the ship's length, and their shadows are cast onto the deck. The ship is moored at a concrete pier with visible lane markings. The surrounding water is a clear, vibrant blue. A semi-transparent grey horizontal band is overlaid across the middle of the image, serving as a background for the text.

Thank You