Technical University of Crete

Department of Production Engineering and Management

Road transportation of hazard goods in Greece

Graduate Thesis

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Chania, January 2024

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Περίληψη

Η μεταφορά επικίνδυνων υλικών αφορά τη μετακίνηση ουσιών που ενέχουν κινδύνους για την ανθρώπινη υγεία και ασφάλεια. Ως εκ τούτου, είναι απαραίτητη η συμμόρφωση με νομοθετικές διατάξεις που εγγυώνται την ασφαλή διαχείριση και μεταφορά τους. Αυτή η διεπιστημονική έρευνα εξετάζει διάφορες πτυχές της οδικής μεταφοράς επικίνδυνων υλικών κι στοχεύει στην ενίσχυση της ασφάλειας και της αποτελεσματικότητας στις μεταφορές μέσω της παροχής γνώσεων για τους υπεύθυνους χάραξης πολιτικής, τους επαγγελματίες και τους ρυθμιστικούς φορείς. Η διατριβή περιλαμβάνει δεκαεπτά κεφάλαια που καλύπτουν ευρωπαϊκούς και ελληνικούς κανονισμούς, τον ρόλο του συμβούλου ασφαλείας επικίνδυνων εμπορευμάτων, την εκπαίδευση κι την πιστοποίηση των εμπλεκόμενων , εξαιρέσεις, ταξινόμηση ουσιών σε κλάσεις, συσκεύασμα, σήμανση, επισήμανση, διατάξεις μεταφοράς, ετήσια επιθεώρηση οχημάτων και ολοκληρώνεται με την αναθεώρηση ενός ψηφιακού εργαλείου καθ' οδόν ελέγχων των οχημάτων που μεταφέρουν επικίνδυνα υλικά. Πρόκειται για το εργαλείο Proteas ADR Control , που αναπτύχθηκε από το Εργαστήριο Νοητικής Εργονομίας και Βιομηχανικής Ασφάλειας της Σχολής Μηχανικών Παραγωγής και Διοίκησης του Πολυτεχνείου Κρήτης σε συνεργασία με το Υπουργείο Υποδομών, Μεταφορών και Δικτύων ,στα πλαίσια των Ευρωπαϊκών Προγραμμάτων PROTEAS LIFE09 ENV/GR/291 και CHEREE LIFE15 GIE/GR/943 με στόχο να συμβάλει στις προσπάθειες των αρμόδιων αρχών για τον αποτελεσματικότερο έλεγχο των οχημάτων που μεταφέρουν επικίνδυνες ουσίες. Η αναθεωρημένη έκδοση του εργαλείου θα λαμβάνει υπόψη όλες τις τροποποιήσεις της Συμφωνίας για τη Διεθνή Οδική Μεταφορά Επικίνδυνων Εμπορευμάτων (ADR) καλύπτοντας την περίοδο από το 2015 έως το 2023.

Abstract

The transport of hazardous goods refers to the movement of substances that pose risks to human health and safety. Therefore, it is essential the compliance with the legislative provisions that guarantee their safe handling and transport. This multidisciplinary research explores various facets of road transportation of hazardous materials and aims to enhance safety and efficiency in transportation through the provision of insights for policymakers, professionals, and regulatory agencies. The dissertation comprises seventeen chapters covering European and Greek regulations, the role of the dangerous goods safety advisor, training and certification of those involved, exemptions, classification of substances, packaging, marking, labeling, general transport provisions, annual vehicle inspection, and is completed with the revision of a digital tool for roadside inspections of vehicles transporting dangerous goods. This is the Proteas ADR Control tool, developed by Cognitive Ergonomics & Industrial Safety Laboratory of the School of Production Engineering and Management of the Technical University of Crete in collaboration with the Ministry of Infrastructure, Transport and Networks ,within the framework of the European Programs PROTEAS LIFE09 ENV/GR/291 and CHEREE LIFE15 GIE/GR/943 , with the aim of contributing to the efforts of the competent authorities for more effective inspection of vehicles carrying dangerous substances. The revised version of the tool shall consider all modifications of the ADR Agreement spanning the period from 2015 to 2023.

1. Introduction

Transportation of hazardous goods refers to the movement of materials or substances that pose a risk to human health, safety, and the environment during transport. These materials, encompass a wide range of substances, including chemicals, gases, liquids, solids, which may exhibit flammable, explosive, toxic, corrosive, or environmentally hazardous properties. So, it is obvious that hazardous materials, by their very nature, possess intrinsic risks that demand careful management throughout the transportation process. Abidance and compliance with the applicable legislation, regulations and safety standards governing the road transport of hazardous materials is the most important step in mitigating these risks and ensuring the safety of the above.

By adopting a multidisciplinary approach, encompassing insights from general transport provisions, safety measures, principles of classification, packaging, marking, labeling, regulatory frameworks, and technological innovations, this research aims to provide a comprehensive analysis of the road transportation of hazardous materials. So as a result, it will enhance safety and efficiency of transportations by offering valuable knowledges for policymakers, transportation professionals, regulatory agencies, and other stakeholders involved in ensuring the safe and compliant transportation of hazardous materials via road networks. The dissertation consists of seventeen chapters which are presented briefly below:

Chapter 2 provides an overview of the European law governing the transportation of hazardous materials, including the United Nations (UN) transport code and the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR Agreement). Additionally, it examines the specific legislative and regulatory framework in Greece concerning the transportation of hazardous materials and the roles of competent authorities in enforcing these regulations.

Chapter 3 delves into the role of Dangerous Goods Safety Advisers (DGSAs) in ensuring the safe transportation of hazardous materials, highlighting their responsibilities and qualifications.

Furthermore, Chapter 4 discusses the establishment and functions of the Greek Association of Dangerous Goods Transportation Safety Advisors (PSSAMEE) in promoting best practices and professional standards among DGSAs in Greece.

Chapter 5 focuses on general safety measures and the responsibilities of key stakeholders involved in hazardous materials transportation, including consignors/senders, loaders, carriers, drivers, payers, and tank/container operators. It delineates the specific duties and obligations of each party in ensuring compliance with safety regulations and minimizing risks during transportation.

Training, examinations, and certifications related to hazardous materials transportation are explored in Chapter 6, with a particular emphasis on general awareness training, safety advisor certification, driver certification, and inspector certification at Vehicle Technical Inspection Centers (KTEO).

Chapter 7 discusses various exemptions provided under the ADR Agreement, including exemptions for small loads, limited quantities, and excepted quantities, and examines the criteria and procedures for availing these exemptions.

Chapters 8 through 12 delve into the classification, packaging, marking, labeling, and equipment requirements for hazardous materials transportation, providing a comprehensive overview of the principles and practices governing these aspects.

Chapter 13 addresses general transport provisions related to loading, unloading, mixed loading prohibition, tunnel restrictions, and provisions for high-consequence dangerous goods, while Chapter 14 discusses vehicle inspections and certification requirements.

Chapter 15 will be a presentation of a revised edition of E-tool Proteas ADR control, designed to facilitate the inspection and control of vehicles transporting hazardous goods. For the comprehension of the tool, will be provided a step-by-step guide to its functionalities and outcomes. The updated edition is in accordance with the stipulations of the ADR 2023.

2. Road transport legislation

2.1 Law and modes of transport

The road transportation of hazardous goods plays a crucial role in the global supply chain, facilitating the movement of materials essential for various industries. The citizens of every country must be protected from the dangers arising from the transport of them For this reason, it is the legislator's obligation to establish specifications, which will provide high safety and prevent accidents as much as possible. The Strategic Road Safety Action Plan of the European Commission for 2021–2030 aims to achieve zero road accident victims by 2050 (“Vision Zero”) The ADR agreement, among other regulatory frameworks, provides a comprehensive set of guidelines to safeguard the transport of these materials, promoting safety, environmental protection, and the efficient movement of goods. Strict adherence to these regulations is crucial for the sustainability of the transportation industry. The specifications for hazardous materials meet recognized high levels of safety. They are constantly checked and adjusted in relation to new experiences and knowledge, as well as the decisions and recommendations of the United Nations and other international competent organizations. Special attention is paid to packaging, marking and loading of materials, training of drivers, as well as the construction, equipment and control of vehicles.

2.1.2 UN Transport Code

In 1953, the Committee of Experts on the Transport of Dangerous Goods was established within the framework of the United Nations. The Commission created the first regulatory system entitled “Instructions for the Transport of Hazardous Materials”. Later, it was developed by a special UN committee (Economic and Social Council’s – ECOSOC), a form of recommendations (Recommendations on the Transport of Dangerous Goods – United Nations, 1993). These recommendations are also known as the UN Transport Code. The UN System contains all the basic requirements for safety during the transport of dangerous goods and is the basis for the development of all international regulations for all modes of transport: Sea, Air, Road, Rail and Water Transport. In particular, the following international treaties, agreements and regulations apply:

• ADR Agreement (European Agreement for the International Carriage of Dangerous Goods by Road).

• RID Agreement (Regulations for the International Carriage of Dangerous Goods by Rail).
• ADN Agreement (European Agreement for the International Carriage of Dangerous Goods by Watercraft).
• IMDG Code (International Maritime Dangerous Goods Code).
• ICAO (Technical Guidelines for the Safe Transport of Dangerous Goods by Air).

Dangerous goods, dangerous substances and objects are characterized by a four-digit UN number, which determines all the parameters related to their transport. Many hazardous substances have a unique UN number (eg acrylamide UN 2074), while groups of chemicals or products may have a common UN number (eg flammable, unless otherwise specified, UN 1993). A substance in solid state may have a different UN number than the same substance in liquid state, if their hazards differ. Also substances of different purity (or concentration) may have a different UN number. UN numbers start from UN number 0001 to approximately UN 3500, and are assigned by the United Nations Committee on the Special Transport of Dangerous Goods. The registration of a substance in a specific class is based on the UN number of this substance.

2.1.2 ADR Agreement

One of the key international frameworks governing this transportation is the European Agreement concerning the International Carriage of Dangerous Goods by Road, commonly known as ADR (Accord Dangereux Routier). The ADR Agreement was created, based on the UN System, in Geneva on September 30, 1957 under the auspices of the Economic Commission for Europe (UNECE) and first implemented on 29 January 1968 (UNECE, 2013). The Agreement was amended by a protocol signed in New York on 21 August 1975 and entered into force on 19 April 1985. In its current form, this document has 2 Annexes; Annex A which defines the goods and their requirements for carriage, and Annex B which lays down the specifications and conditions of the vehicles performing the carriage.

The regulations are split into 9 Parts or Chapters and margined for reference. In October 1992, the ADR regulations were reformatted to a more user-friendly format. The books are in 2 volumes of approximately 1200 pages. These books have corrigenda issued to them regularly and are reprinted/updated every 2 Years.

Consequently, to the amendments that entered into force on 1 January 2023, a revised consolidated version has been published as document ECE/TRANS/326, Vol. I and II (ADR 2023).

It has been split into nine parts, and still grouped under two annexes. The layout is as follows:

CATEGORY	PARTS	CONTENTS
ANNEX A		
General provisions	*Part 1*	Definitions, General Requirements
Classification	*Part 2*	Classification of substances and presentation of dangerous goods classes.
Dangerous goods list, special provisions of limited and excepted quantities	*Part 3*	The List of Dangerous Goods (TABLE A). It provides information and specifications depending on the type of substance.
Packing	*Part 4*	Use of packagings and tank provisions.
Consignment procedures	*Part 5*	Procedures for marking and labeling packages and transport documents.
Requirements for the construction and testing of packagings	*Part 6*	Analyzes manufacturing information for all packages, tanks, bulk containers and defines the procedures for the approval of them.
Transport processes	*Part 7*	Provisions concerning the conditions of carriage, loading, unloading and handling.
ANNEX B		
Vehicle, Crew and Equipment	*Part 8*	Requirements for vehicle crews, equipment, operation and documentation.
Vehicle Construction Specifications	*Part 9*	Requirements concerning the construction and approval of vehicles.

Table 1. The parts of ADR Agreement

2.2 Greek legislations & regulations

The road transport of dangerous goods in Greece is determined by the ADR agreement, as applicable each time, and the Road Traffic Code (K.O.K.).

K.O.K. it was ratified by Law 2696/1999 (Government Gazette 57/A΄ 23-3-1999), while after 8 years it was amended by Law 3542/2007 (Government Gazette 50/A΄ 2-3-2007). Also important is Law 1959/91, which regulates matters related to trucks. K.O.K. introduces special provisions concerning dangerous goods (P-45 Plate) and their transport vehicles, apply provisions on loading (permitted weight), periodic technical inspection, etc. Especially in K.O.K. (L. 2696/99) it is noted:

• In article 13 on "drivers" (par. 4) that "The driver of a vehicle that transports dangerous substances above certain quantities must have the necessary medical training, according to the relevant provisions, to act and drive the car, so that people, the environment, animals and his personal safety are not at risk."

• In article 20 on "speed limits" (par. 4) that: "For lorries and their combinations, which transport dangerous goods, by decision of the Ministry of Transport and Communications, maximum permissible speed limits are determined, lower than those defined above, depending on the dangerousness of the transported cargo and the technical specifications of the means of transport." The lower limits are listed in the KOK's table of maximum permitted speed limits.

• In paragraph 29 of article 81 that: "Vehicles transporting dangerous goods must carry signs identifying the danger of the load and special signs, in accordance with the provisions applicable to the transport of these provisions."

About the ADR Agreement, Greece validated it in the year 1987 with Law No 1741/1987, so since then it is a law of the Greek state that regulates the international transport of dangerous goods The agreement is revised every two years and Greece accepts the amendments and complies with them through ministerial decisions.

With the 50941/40/90 (Government Gazette 104B) and 71538/2868/97 decisions of the Minister of Transport and Communications, the revised texts of the ADR Agreement of the years 1990 and 1995 were accepted respectively. With the presidential decree 104/99,

the Greek legislation was adapted to the European 94/55/EC. Thus, the ADR Agreement also applies to the national transport of dangerous goods in the Greek area.
The last revision of the ADR Agreement valid in Greece is that of 2023 and was made with the publication of Ministerial Joint Decision Y.A. 200035/2023 adapting the Greek legislative frame with the provisions of EU Directive 2020/1833/EE on the inland transport of dangerous goods. The November of 2018 the legislation YA C6/57084/1981/2018 (Government Gazette 3135/B΄) entered into force, and this classifies violations into categories and defines administrative sanctions for violations of the ADR Agreement

There are many more laws, ministerial decisions and presidential decrees, which specifically regulate issues concerning the road transport of dangerous substances in Greece, such as the professional training of drivers of vehicles transporting dangerous goods, the internal transport of dangerous goods, the roles and the responsibilities of the ADR control bodies and the technical specifications for the construction of vehicles and tanks for the transport of dangerous materials, issues concerning the Safe Transport of Dangerous Goods Advisors (S.A.M.E.E.) etc. A basic circular is the no. 1773/2016 which was published in the Official Gazette on 7-3-2016, which defines the roles and responsibilities of the entities involved in dealing with and managing the consequences of incidents/accidents during the road and rail transport of dangerous goods.

Main legislations relating to the transport of hazardous materials

- Presidential Decree 256/1999 (Government Gazette 209/A` 11.10.1999) https://elinyae.gr/sites/default/files/2019-07/209A_99.pdf
  Adaptation to Directive 95/50/EC. It refers to controls during the transport of dangerous goods. Contains as appendices: Checklist, List of violations, Violation report template
- Presidential Decree 104/1999 (Government Gazette113/A` 4.6.1999) https://elinyae.gr/sites/default/files/2019-07/113A_99.pdf
  Adaptation to Directive 94/55/EC and amendments with the Official Gazette Φ2/21099/1700 (Government Gazette 509/B) and 21736/2092/99 (Government Gazette 1232/B/01)

Drivers - Safety advisors - Vocational training

- Presidential Decree 355/1994 (Government Gazette 189/A` 15.11.1994)
  https://www.elinyae.gr/sites/default/files/2019-07/189A-94.pdf
  Professional training of drivers (adjustment to directive 89/684/EEC). It refers to qualifications, syllabus, sanctions etc. This is the basic legislation, which is then partially amended each time by the subsequent Presidential Decrees.
- Ministerial Decision 60740/1027/1995 (Government Gazette 246/B` 3.4.1995)
  https://elinyae.gr/sites/default/files/2019-07/246B_95.pdf
  It was issued in implementation of the above Presidential Decrees and specializes in issues of Training Schools, examined courses and material, etc. It also presents a form of the relevant certificate.
- Presidential Decree 32/1996 (Government Gazette 23/A` 12.2.1996)
  https://elinyae.gr/sites/default/files/2019-07/23A_96.pdf
  Professional training of drivers (adaptation to directive 89/884/EEC). It refers to the qualifications of the drivers in order to receive the relevant certificate.
- Ministerial Decision 72572/2977/1997 (Government Gazette 848/B` 24.9.1997)
  https://elinyae.gr/sites/default/files/2019-07/848B_97.pdf
  Amendment and completion of the 60740/1027/95 in terms of training programs, the examination method and presents the format of the new professional training certificates of all categories.
- Presidential Decree 106/1998 (Government Gazette 97/A` 5.5.1998)
  https://elinyae.gr/sites/default/files/2019-07/97A_98.pdf
  Professional training of drivers (adaptation to directive 89/684/EEC). It refers to the qualifications of the drivers in order to receive the relevant certificate.

- Ministerial Decision 64834/5491/2000 (Government Gazette 1350/B` 7.11.2000)
  https://elinyae.gr/sites/default/files/2019-07/1350B_00.pdf
  Professional training requirements, examinations, duties and certificates of Safety Advisor (DGSA) for the land and sea transport of dangerous goods.
- Presidential Decree 346/2001 (Government Gazette 233/A` 11.10.2001)
  https://elinyae.gr/sites/default/files/2019-07/233A_01.pdf
  refers to the profession of road transporter of goods and passengers and mutual recognition of diplomas, certificates and other titles that facilitate the realization

of the right of establishment of these carriers in the field of domestic and international transport

- Legislative circular 232630/2021 (Government Gazette /-- 1.9.2021)
  https://elinyae.gr/sites/default/files/2021-09/232630_2021.pdf
  Decisions regarding the operation and specifications of Professional Training Schools for Drivers of Vehicles for the Transport of Dangerous Goods (S.E.K.O.M.E.E.), Training programs for drivers of ADR vehicles for the transport of dangerous goods.

Inspection of vehicles, tanks and tank trucks

- Ministerial Decision 76389/3344/00/2001 (Government Gazette 254/B` 9.3.2001)
  https://www.elinyae.gr/sites/default/files/2019-07/fek254-01.pdf
  It concerns the approval of a single vehicle for the carriage of dangerous goods, the approval of tanks after testing, the approval of a trailer or on-board vehicle, technical descriptions, etc.
- Ministerial Decision 32591/3257/2001 (Government Gazette 703/B` 6.6.2001)
  https://elinyae.gr/sites/default/files/2019-07/703B_01.pdf
  Terms and conditions for the recognition of inspector centers for vehicles transporting dangerous goods of the European ADR Agreement.
- **Ministerial Decision 132756/2023 (Government Gazette 2887/B` 2.5.2023)**
  https://www.elinyae.gr/sites/default/files/2023-05/2887%CE%B2_2023.pdf
  Publication of vehicle registration certification transporting dangerous goods and obligations of ADR inspection bodies

2.3 Greek competent authorities

Competent authorities and regulatory agencies in Greece related to the transport of dangerous goods according to the ADR:

Ministry of Infrastructure, Transport and Networks

General Division of Road Safety, Division of road traffic and safety, Department of Road Safety Transport of Dangerous Goods and Perishable Foodstuffs

Competent authority for class 1 (transport permissions)

Ministry of Citizen Protection

Hellenic Police Headquarters

Security and Order Branch

State Security Division

3d Department of Weapons and Explosives

Competent authority for class 7 (transport permissions and training)

GAEC - Greek Atomic Energy Commission

Competent authority for the classification of Dangerous Goods

Ministry of Economy and Finance

General Chemical State Laboratory

Directorate of Environment

Competent authority for transportable pressure equipment

Ministry of Development and Competitiveness

General Secretary for Industry

3d Directorate for Sectorial Industrial Policy

Examining Body of DGSA (Dangerous Goods Safety Advisor)

National Technical University of Athens

School of Mechanical Engineering

Laboratory of Machine Elements

3. **Dangerous goods safety advisers** (in english DGSA**,** in greek SAMEE)

Dangerous Goods Safety Advisor (DGSA) is a person certified to provide advice to undertakings whose activities include the consignment, carriage, or the related packing, loading, filling or unloading of dangerous goods, to monitor compliance with legal requirements and to ensure the preparation of an annual report. The duties of a DGSA are listed in ADR 1.8.3.3 and include the following:

- Classification of dangerous goods

Categorization of the goods in the corresponding classes, in accordance with ADR Chapter 2.2. The providing of a written copy usually is required, with all test results and the mechanism by which the classification process was carried out for each of the dangerous goods addressed. The testing must be carried out in accordance with the ADR and the UN Manual of Tests and Criteria.

- Packaging and tank provisions

Advising regarding the choice of suitable means for storing of dangerous goods. Such advice must give adequate detail to ensure the purchase and appropriate use of packaging, tanks, containers and vehicles for the relevant dangerous goods.

It is important to ensure the keeping of all necessary packaging type approval certification and conditions of use if prepared by a manufacturer or supplier. For example, when filling an Intermediate Bulk Container (IBC), you should ensure that it is of the correct design type and within inspection date, it is not filled beyond any filling limit, it is marked and labelled appropriately, and closures are sealed prior to loading.

Vehicles and tanks and certain types of packaging require appropriate initial/type approval certification requirements and ongoing test and inspection requirements. These must be covered by appropriate procedures to ensure ongoing compliance such as verification checks on gas cylinders, plastics containers, IBCs, large packaging and tanks prior to use to ensure they are in date and marked and labelled appropriately.

- Consignment Procedures

Control on compliance of procedures for proper consignment of dangerous goods. Monitoring the undertaking’s mechanisms to ensure that personnel involved in the carriage, packing, filling, loading and unloading of dangerous goods are provided with

detailed operating procedures (SOPs) and instructions to ensure compliance with ADR. Such instructions include details of the following:

-The appropriate use, marking and labelling of packages in accordance with ADR 5.2.

-The placarding and marking of containers, multiple element gas containers (MEGCs), tanks and vehicles in accordance with ADR 5.3.

-The appropriate documentation as specified by ADR 5.4.

-Loading, stowage, carriage and unloading of dangerous goods is in compliance with the best practice guidelines. It must be ensured that loads do not shift, fall or lead to a loss of containment or put at risk other vehicles.

Where appropriate, must be checked the preparation of the security plan in accordance with ADR 1.10.3.2 for dangerous goods described as high consequence dangerous goods.

- Exemptions

Guidance on the proper application of any relevant exemptions related to:

-the nature of the transport operation (ADR 1.1.3.1),

-the carriage of gases (ADR 1.1.3.2),

-the carriage of liquid fuels (ADR 1.1.3.3),

-special provisions or dangerous goods packed in limited or excepted quantities (ADR Chapters 3.3 - 3.5),

-empty uncleaned packaging (ADR 1.1.3.5),

-small loads or packaged goods in limited quantities or excepted quantities.

-national exemptions

- Selection, purchasing and approval of vehicles

May be required advise on, review and monitor the procedures of the company with respect to the selection and purchasing of vehicles meeting the requirements of ADR Part 9, or the provision and renewal of certificates of approval for vehicles. Certain vehicles (see ADR 9.1.2.1 - EX/II, EX/III, FL, AT and mobile explosives manufacturing units (MEMUs)) must be type approved and subject to initial inspection prior to service and thereafter annual inspections.

- Safety Equipment and Transport Equipment

All transport equipment must be subjected to regular general inspections and certain equipment requires testing, certification (type approval) and may be subject to periodic inspection in accordance with the requirements of ADR Parts 6 and 9.

Under ADR Part 6, pressure receptacles and tanks require testing, certification and periodic inspection. Pressure receptacles and tanks for the carriage of class 2 gases and specific other dangerous goods are subject to the provisions of the Transportable Pressure Equipment Directive (TPED) and require conformity assessment and inspection by notified bodies.

- Training

Reviewing and monitoring the procedures for the provision of adequate training of personnel in accordance with ADR Chapter 1.3 and maintenance of appropriate training records. This includes

-general awareness training for staff involved in the consignment, packing, filling, loading, stowage, securing and unloading of dangerous goods

- function specific training about creating transport documents, the securing of dangerous goods on vehicles by loaders/drivers

-hazard awareness, safety and security training (ADR 1.10.2)

-monitor requirements for driver training in accordance with ADR Chapter 8.2.

- Emergency Procedures and accident investigation

In the event of an accident or incident during the carriage of dangerous goods by road, including loading and unloading operations, the Advisor must be able to handle incidents such as fires and explosions, road traffic accidents or loss of containment of dangerous goods, events such as breakdowns or a transport unit becoming immobilized for any reason. It is essential to be aware of the requirements for supervising vehicles as detailed in ADR 8.4, for example, it may be necessary to identify possible secure locations on a route where a vehicle may be safely parked overnight. Advisor should be able to

offer appropriate provision of equipment, services and training including vehicle and dangerous goods recovery at offsite locations, emergency contacts for local authorities, recovery services (vehicles and chemical spill clean-up), environmental and remediation services. Accident and incident investigation

In the case of serious accidents or incidents (ADR 1.8.5), it needs the preparation of a report according to the model in ADR 1.8.5.4. , for the company and if required, for submission to the regulatory authorities. This must investigate the accident and conclude recommendations to improve procedures, operational shortcomings or training requirements. Assessment of findings and recommendations following any incident and

mechanisms to ensure remedial actions are implemented for the purpose of avoidance the recurrence of accidents

- Preparation of annual report

The preparation of an annual report that must record in detail all activities in respect of the carriage of dangerous goods during the period in question.

The annual report aims:

-Inform the management of the company as to the extent of dangerous goods activities and standard of compliance achieved during the period.

-Provide recommendations with respect to areas which need improvement or corrective action.

-Facilitate inspection and investigation by the regulatory authorities in the performance of their statutory duties in an efficient and effective manner. Records of annual reports must be held by the undertaking for 5 years and be readily available for review by an inspector. Any supporting documentation must also be available.

-Provide details of the activities of the DGSA.

<u>Legally requirement the selection of a Dangerous Goods Safety Advisor by a business or organization</u>

The specialized knowledge required for the safe handling of these goods forced the government to enact new laws for the businesses whose activities include the road transport of dangerous goods or the related work of packaging, loading / unloading or filling dangerous goods for road transport. According to Protocol No. Γ3/61641/9710/2016 (Government Gazette /-- 10.2.2016) are required to have one or more a Dangerous Goods Safety Advisor (DGSA), responsible for contributing to the prevention of risks that such activities involve for individuals, assets and the environment. Their duties include monitoring compliance with legislation, providing guidance to the business through the preparation of an annual report as well as the preparation of a report in the event of incidents, accidents or serious violations.

Businesses are obliged to disclose the identity of the DGSA, they employ, to the competent Directorate of the Ministry, to the relevant Directorate of Transport and Communications of the P.E., to the relevant Security Directorate or Police Directorate of the Prefecture and to the relevant Regional Administration of the Port Authority - Hellenic Coast Guard of the Region where the company is based. The main task of DGSA is, under

the responsibility of the head of the business, to facilitate the carrying out of the aforementioned operations in accordance with the applicable requirements and in the safest possible way.

Who does this Concern?	Businesses and Organizations whose operations include the transportation of dangerous goods by road, rail or sea as well as the loading/unloading procedures related to the transport of these categories of goods.
Description	The DGSA performs frequent safety inspections on heavy vehicles that transport dangerous goods as well as on the loading/unloading facilities where the goods are handled. Further, the DGSA is responsible for the proper training of all employees who handle these categories of goods in any capacity.
Responsibilities	The DGSA is responsible for the inspection of the following: • General safety measures and measures for accident prevention • Classification of the dangerous goods that are handled by the business • General guidelines for the handling and storage of the specific dangerous goods • Transportation instructions and product labeling • Professional qualifications of the drivers transporting the goods and the employees involved in loading and unloading. • Necessary documentation and driver certification for the transport of dangerous goods • Draft safety directives • Further, the DGSA is responsible for drafting an annual report for the management of the client company regarding all areas of the company's operations in the transport of dangerous goods. This report is also filed with the Department of Road Safety and Environment which is attached to the Ministry of Transportation and

	Communication, as well as with the relative Police Department.
What a DGSA service includes	The DGSA services are provided during the visits to the location of the client's operation. According to the law, the DGSA is not required to be on location at set times. The time spent on location is determined by the parties involved and by the nature of the transport, loading/unloading operations.

Table 2. The service of Dangerous Goods Safety Advisor at businesses and organizations

Guidance on preparing the DGSA annual report by the

European Association of the Dangerous Goods Safety Advisers (EASA)

DANGEROUS GOODS SAFETY ADVISER'S ANNUAL REPORT			
For period:			
The report relates to activities within the scope of:	□ ADR □ RID □ ADN		
Full identity of undertaking to which this report relates (contact details):			
Have non-compliances with the requirements governing the carriage of dangerous goods been identified by the DGSA?	[ ] yes. For details see annex.	[ ] no	
Method of carriage:	[ ] in packages	[ ] in tanks	[ ] in bulk

Information on the kind of carriage operations and quantities of goods										
Class	Type of transport operations						Quantity (t/annum)			
	Consigning	Carriage	Packing	Loading	Filling	Unloading	< 5	5-50	50-1000	> 1000
1										
2										
3										
4.1										
4.2										
4.3										
5.1										
5.2										
6.1										
6.2										
7										
8										
9										

DGSA TASKS (as specified in 1.8.3.3)				
	Task	**Yes**	**No**	**N/A**
1	Do procedures exist for compliance with the requirements governing the			

	identification of dangerous goods being transported? Comments:			
2	Does the undertaking's practice take into account, when purchasing means of transport, any special requirements in connection with the dangerous goods being transported? Comments:			
3	Do procedures exist for checking the equipment used in connection with the carriage, packing, filling, loading or unloading of dangerous goods? Comments:			
4	Are the undertaking's employees properly trained, and records of such training are maintained? Comments:			
5	Are proper emergency procedures implemented in the event of any accident or incident that may affect safety during the carriage, packing, filling, loading or unloading of dangerous goods? Comments:			
6	Is there investigation and, where appropriate, preparation of reports on serious accidents, incidents or serious infringements recorded during the carriage, packing, filling, loading or unloading of dangerous goods?			

	Comments:			
7	Are appropriate measures implemented to avoid the recurrence of accidents, incidents or serious infringements? Comments:			
8	Is account taken of the legal prescriptions and special requirements associated with the carriage, packing, filling, loading or unloading of dangerous goods, in the choice and use of sub-contractors or third parties? Comments:			
9	Do employees involved in the carriage, packing, filling, loading or unloading of dangerous goods have detailed operational procedures and instructions? Comments: [checklists?]			
10	Have measures been introduced to increase awareness of the risks inherent in the carriage, packing, filling, loading and unloading of dangerous goods? Comments:			
11	Have procedures been implemented to ensure the presence on board the means of transport of the documents and safety equipment which must accompany transport and the compliance of such documents and equipment with the regulations?			

	Comments: checklists			
12	Have procedures been implemented to ensure compliance with the requirements governing packing, filling, loading and unloading? Comments:			
13	Does a security plan exist as indicated in 1.10.3.2? Comments:			
Other Comments:				

The report is prepared by:			
Adviser's full name	Adviser's certificate code	Adviser's signature	Date of preparation

Signature of responsible person of undertaking

Table 3. Template of Annual Report Dangerous Goods Safety Advisor

4. Greek association of dangerous goods transportation safety advisors (PSSAMEE)

The statute of the Advisor for the Safe Transport of Dangerous Goods (SAMEE) has been implemented in Greece since 2001 based on the KYA 64834/5491 of the Ministry of National Economy and Finance and the Ministry of Transport and Communications. It is a non-profit Association based in Athens. Its purpose is indicatively:

- The facilitation of safe road transport of dangerous goods and related loading and unloading in accordance with Greek, European and International experience and legislation.
- The awareness of business employees and citizens about the necessity for taking measures to minimize the risks associated with the transport or loading and unloading of dangerous goods.
- The provision of advice to Governments and Organizations (Greece and abroad), Ministries (Transport, Agriculture, etc.), Local Government Bodies, Chambers (EBEA, TEE, etc.) as well as to non-Governmental Organizations, on the union's areas of interest.
- The promotion of scientific and technological research in the areas of interest of the Association and the exchange of experiences, methods and opinions with research centers, universities and other organisations.
- Legislative information and further training of the members of the Association in the sector of transport of dangerous goods.
- The undertaking and carrying out of training programs and safety programs and the prevention of related risks and accidents, in the areas of businesses that transport dangerous goods as well as the provision of advice regarding the above sectors in the Private or Public sector.

5. General safety measures and the main duty holders

5.1 General safety measures

Precautionary measures for the safe road transport of dangerous goods

- Introduction of measures and compliance with them
- General training of all persons involved (employers and employees who participate in transport procedures must be aware of basic safety regulations and special information according to their work position and the type of transported substance)
- Driver training with both theoretical and practical programs
- Technical maintenance of vehicles and provision of required equipment (ADR approval certificate issued by the competent authorities. They release vehicle registration after check and inspection by an expert who has been certified by Teaching Federation of Greece or National Technical University of Athens)
- Road network maintenance

5.2 Main duty holders

Addressing all participants, ADR states:

"The participants in the carriage of dangerous goods shall take appropriate measures according to the nature and the extent of foreseeable dangers, so as to avoid damage or injury and, if necessary, to minimize their effects. They shall, in all events, comply with the requirements of ADR in their respective fields.

When there is an immediate risk that public safety may be threatened, the participants shall immediately notify the emergency services and shall make available to them the information they require to take action."

This general provision means that all participants must ensure that they take all necessary actions to reduce the risk of an incident involving dangerous goods.

During the transport process many persons involve, the main ones being the consignor, the carrier, the driver, the filler, tank operator, the uploader. Each person has specific duties and responsibilities, some of them are presented below.

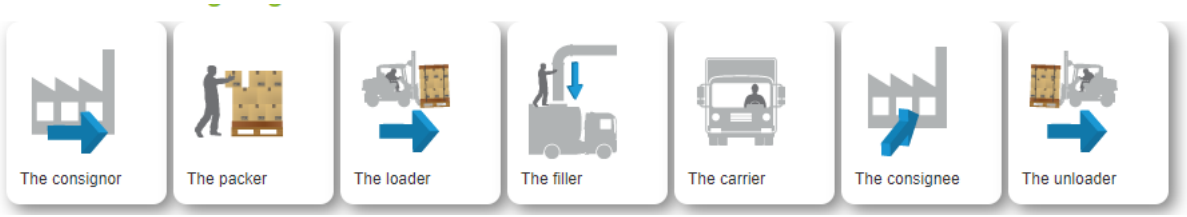


Fig. 1. Assigning Duties (from ARCADEMY eLearning Dangerous Goods by Road)

5.2.1 Responsibilities of the consignor(sender)

-Printing of the transport document and the accident report highlighting the transport of hazardous materials and their important characteristics

-Checking that the specific goods are allowed to be transported in accordance with the existing ADR agreement as well as preparing the marking that will be needed

-Choosing of the appropriate packaging, container for bulk cargo and tanks with affixing of appropriate markings and control of permitted quantities

5.2.2 Responsibilities of the loader – carrier

-Informing the driver that it is a transport of hazardous materials and if it is a tanker then it is necessary to inform him about the filling level

-Delivery and verification of the validity of transport documents, vehicle's registration driving license, professional training certificate and protective equipment to the driver

-Control of vehicle overloading, integrity of packages, safety valves, as well as placement of danger labels and markings

-Compliance with mixed loading requirements and safety measures for food, animal feed, etc.

5.2.3 Responsibilities of the driver

It is necessary to present the transfer documents with him, including the ADR training certificate

-Observance of the speed limit, parking and vehicle equipment regulations as well as filling and cargo tightness limits.

-During loading and unloading to supervise and guide the loader in order to achieve a correct distribution of the packages based on the axles of the vehicle and check their integrity

-Notification of the vehicle's location and communication with the authorities if anything suspicious is observed, and application of lessons learned in the event of an accident.

5.2.4 Responsibilities of the payer

-Filling tanks with approved liquids, if only if they have been tested and found that both they and their equipment are in a satisfactory technical condition

-Supervision of filling, observing the maximum permissible degree of filling or the maximum permissible mass of contents per litre of capacity for the substance being filled.

-After filling checking that the closing devices are leakproof, cleaning any residues of the transported substance, and placing the necessary signs and labels.

5.2.5 Responsibilities of the tank-container/portable tank operator

-Ensure compliance with the requirements for construction, equipment, tests and marking.

-Guarantee that the maintenance of shells and their equipment is carried out, under normal operating conditions, the tank container/portable tank satisfies the requirements of ADR until the next inspection;

-Have an exceptional check made when the safety of the shell or its equipment is liable to be impaired by a repair, an alteration or an accident.

5.2.6 Responsibilities of Unloader

- Ascertainment that the correct goods are unloaded by comparing the relevant information on the transport document with the information on the package, container, tank or vehicle.

-Before and during unloading, check whether the packagings, the tank, the vehicle or container have been damaged to an extent which would endanger the unloading operation.

-Removing any dangerous residues which have adhered to the outside of the tank, vehicle or container during the process of unloading and ensure the closure of valves and inspection openings.

-Verify that the prescribed cleaning and decontamination of the vehicles or Containers are carried out.

Table 4 gives examples of documents which must be retained by businesses involved with the carriage of dangerous goods.

Document	Participant responsible	Retention period
Transport documents	Consignor and carrier	Three months
Training records	All employers	Duration of employment plus one year
Annual report (DGSA)	Consignor and carrier	Five years
Vehicle certification	Carrier/operator	Period of use
Tanks certification	Operator	Period of use
Packaging certification (available on request from packaging manufacturer)	Consignor	Period of use
Packaging test reports	Consignor	Until the next test report is issued

Table 4. Retention period of records (HAS Carriage Dangerous Goods by Road 2021 Section 18)

6. Training, examinations and certifications

6.1 General awareness training

People, whose duties concern the carriage of dangerous goods, must be trained in the requirements governing the carriage of such goods appropriate to their responsibilities and duties.

Employees must be trained before assuming responsibilities, and the training will related to general awareness, function specific training, and safety and security training. Personnel must be familiar with the general requirements of the provisions for the carriage and be trained about their duties and responsibilities under the requirements of the regulations concerning the transportation of dangerous goods.

Training must include security awareness, depended from the nature of security risks, recognizing security risks, handling methods that aim to reduce such risks and actions to be taken in the event of a security breach. All training must be supplemented periodically with refresher training to take account of changes in regulations, at least every two years to coincide with each new edition of the ADR. Training may be conducted by an organization if it is competent to do so, or provided by a commercial training company.

6.1.1 Center for Education and Lifelong Learning (K.E.DI.VI.M.)

K.E.DI.VI.M is an independent authority of each university that ensures coordination and interdisciplinary cooperation in the development of programs of education. So, was created to contribute to the continuous training of adults, scientists and professionals, helping them to develop skills and acquire knowledge that will prove valuable throughout their working lives. All programs offer a Certificate of Specialist Training.

Through these Centers, every action of non-formal education and informal learning is carried out and certified, in collaboration with universities or research institutes. The preparation and implementation of the programs is based on the national and European institutional framework.

The K.E.DI.VI.M. of National technical university of Athens offers many programs which cover a wide range of engineering science, respond to the cognitive needs of modern technological challenges and, of course, are provided in compliance with the high scientific standards of the country's largest technological institution. Some of the programs about the transportation of dangerous goods it offers are:

Seminar “SAFE TRANSPORTATION OF DANGEROUS GOODS”

This program provides the necessary background knowledge to help participants understand complex issues surrounding the safe land, sea and air transport of dangerous goods.

Academic year: 2023-2024

Circle: 1st

Cost: €650

Guide https://e-learning.ntua.gr/programs/safe-transport-of-dangerous-goods/

Faculty: mechanical engineers

Degree provided: Certificate of specialized training

Direction: transportation

Duration (in hours): 100

E-learning: 50 %

Asynchronous e-learning: 50%

Education level: University/ATEI degree, high school diploma

Knowledge of a foreign language: foreign language (level b2)

Professional experience: -

Registration documents: foreign language certificate

Online Seminar “TRAINING OF ADR/RID SAFE LAND TRANSPORT OF DANGEROUS GOODS ADVISOR CANDIDATES “

This program is a training program and upon its completion the trainee will have the necessary knowledge to understand complex issues related to the safe land transport and handling of dangerous goods.

Academic year: 2023-2024

Circle: 6th

Cost: 1000/ 900/ 200€

Guidehttps://e-learning.ntua.gr/programs/training-adr-rid-safe-land-transportation-of-dangerous-goods-consultants/

Faculty: mechanical engineers

Degree provided: Certificate of specialized training

Direction: transportation

Duration (in hours): 40/44

E-learning: %

Asynchronous e-learning: %

Education level: University graduate, Technological Educational Institute (TEI) graduate, Master's degree graduate

Knowledge of a foreign language: -

Professional experience: -

Registration documents: degree

6.2 Certification of safety advisor

Defining the process of training for getting the certificate of a Dangerous Goods Safety Advisor (DGSA) according to Ministerial Decision 52526/6904/2007 (Government Gazette 1900/B` 14.9.2007).

The certificate indicates the way of land transport: (road transport, rail transport) and the categories of dangerous goods (class 1, class 2, class 7, classes: 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 8 and 9, class 3, including petroleum products UN 1202, 1203, 1223) to which it applies.

The certificate is issued by the competent Transport and Communications Service of the relevant Prefectural Government, in the area where the interested party has his permanent residence, in cooperation with National Technical University of Athens. The certificate is valid for five (5) years from date of successful examination. It is granted to people who meet the following conditions:

- ✓ They have a degree from a national university or technical institution or equivalent degree from a recognized school abroad.
- ✓ They have driving license for a category B motor vehicle.
- ✓ They have a valid residence permit or work permit if they are foreigners.
- ✓ They have attended the necessary special training course
- ✓ They have successfully passed the written examination

The exams are conducted in three phases (A, B and C). The candidate is considered to have passed the examinations of phases A, B and C when he has obtained a score of at least sixteen (16) with an excellent score of twenty (20) in each phase of examinations separately. Any candidate can participate in phases B and C if they have been deemed successful in phase A and B respectively.

The A phase examination sheet includes ten (10) development questions on topics that cover at least:

a. General prevention and safety measures (knowledge of the various consequences that can arise from an accident with dangerous goods, knowledge of the main causes of an accident)

b. The classification of dangerous goods (classification process of solutions and mixtures, structure of the enumeration of substances, classes of dangerous goods and principles of their classification, the nature of dangerous substances and objects, physicochemical and toxicological properties)

c. General packing provisions, including provisions for tanks, tanks - containers and tank vehicles, etc.

d. Hazard markings and labels

e. Information in the transport document

f. Handling and stowage

g. Crews, professional training

h. Vehicle documents and transport certificates

i. Written instructions

j. Transport Equipment Requirements.

The duration of the A phase examination is sixty (60) minutes

The B phase examination paper includes four (4) development questions on topics related to the means of transport and cover at least:
a. The mode of shipment and shipping restrictions (full load, transport in bulk, transport in medium capacity containers for bulk cargo, transport in containers, transport in fixed or demountable tanks)
b. Passenger transport
c. Separation of goods
d. Traffic regulations and restrictions.
For examinations in both road and rail transport the questions included in the examination sheet are two (2) per means of transport. In addition, the candidates carry out on a separate examination sheet an analysis of a specific case (case study) related to the tasks of the SAMEE of Annex I of No. 64834/5491/13.10.2000. In the case of extension to a second means of transport, the interested party is examined in a questionnaire examination sheet that includes four (4) development questions. The total duration of the B phase examination is sixty (60) minutes.

The C phase examination sheet includes twelve (12) development questions, which are specialized in the category of dangerous goods in which the candidates are examined, and cover at least:
a. Mixed loading prohibitions and precautions
b. Limiting the quantities carried and
quantity exceptions
c. Cleaning and/or venting before loading and
after unloading
d. Supervision requirements (parking)
e. Operational discharges or unexpected leaks
contaminants.
In the case of examinations in more than one category of dangerous goods, the questions asked per category are equally distributed as far as possible. Twelve (12) development questions are asked in each extension to an additional category of dangerous goods. The duration of the C phase examination is eighty (80) minutes.

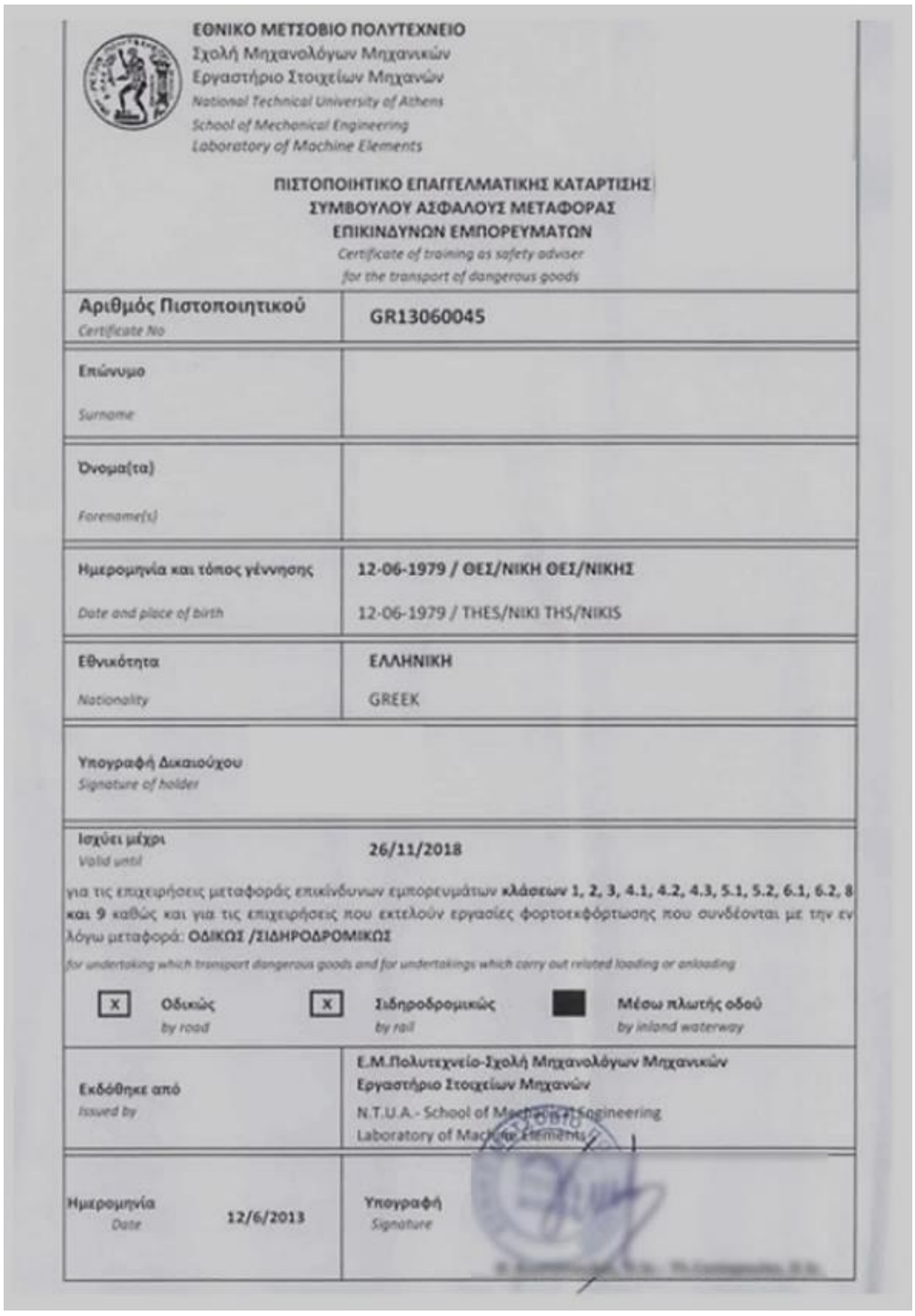
The training programs are announced to the competent Departments of the Ministry of Education and Culture, which have the supervision and control of the training. Each interested person, depending on the certificate he wants to obtain or extend, attends the corresponding training program.

The initial certification training program includes the following sequential phases:

- The basic training lasting at least twelve (12) hours
- Additional training lasting at least four (4) teaching hours for each means of transport (road / rail transport)
- Additional training lasting at least six (6) teaching hours for each category of transported goods

The candidate is deemed to have attended successfully the above program as long as his total absences do not exceed three (3) hours. Otherwise, he is obliged to attend the phase or phases that were found to be exceeded absences.

Safety Advisor training programs for road transport of all classes except Class 7 are conducted by: a) Training and Lifelong Learning Centers (K.E.D.I.V.M.) of Universities departments with the subject of Chemical Engineering or Mechanical Engineering or University Laboratories with the scientific field of vehicles or the transport of dangerous goods, in accordance with provisions of Law 4957/2022 (A' 141). b) Professional Training Schools for Drivers of Vehicles for the Transport of Dangerous Goods which operate in accordance with the provisions of no. 219406/2021 (B' 3798) of joint ministerial decision. Training programs for Class 7 (radioactive materials) are carried out by the Hellenic Atomic Energy Commission (EEAE).



ΕΘΝΙΚΟ ΜΕΤΣΟΒΙΟ ΠΟΛΥΤΕΧΝΕΙΟ
Σχολή Μηχανολόγων Μηχανικών
Εργαστήριο Στοιχείων Μηχανών
National Technical University of Athens
School of Mechanical Engineering
Laboratory of Machine Elements

ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΕΠΑΓΓΕΛΜΑΤΙΚΗΣ ΚΑΤΑΡΤΙΣΗΣ ΣΥΜΒΟΥΛΟΥ ΑΣΦΑΛΟΥΣ ΜΕΤΑΦΟΡΑΣ ΕΠΙΚΙΝΔΥΝΩΝ ΕΜΠΟΡΕΥΜΑΤΩΝ
Certificate of training as safety adviser for the transport of dangerous goods

Αριθμός Πιστοποιητικού *Certificate No*	**GR13060045**
Επώνυμο *Surname*	
Όνομα(τα) *Forename(s)*	
Ημερομηνία και τόπος γέννησης *Date and place of birth*	**12-06-1979 / ΘΕΣ/ΝΙΚΗ ΘΕΣ/ΝΙΚΗΣ** 12-06-1979 / THES/NIKI THS/NIKIS
Εθνικότητα *Nationality*	**ΕΛΛΗΝΙΚΗ** GREEK
Υπογραφή Δικαιούχου *Signature of holder*	
Ισχύει μέχρι *Valid until*	**26/11/2018**

για τις επιχειρήσεις μεταφοράς επικίνδυνων εμπορευμάτων **κλάσεων 1, 2, 3, 4.1, 4.2, 4.3, 5.1, 5.2, 6.1, 6.2, 8 και 9** καθώς και για τις επιχειρήσεις που εκτελούν εργασίες φορτοεκφόρτωσης που συνδέονται με την εν λόγω μεταφορά: **ΟΔΙΚΩΣ /ΣΙΔΗΡΟΔΡΟΜΙΚΩΣ**
for undertaking which transport dangerous goods and for undertakings which carry out related loading or unloading

[X] **Οδικώς** *by road* [X] **Σιδηροδρομικώς** *by rail* [ ] **Μέσω πλωτής οδού** *by inland waterway*

Εκδόθηκε από *Issued by*	**Ε.Μ.Πολυτεχνείο-Σχολή Μηχανολόγων Μηχανικών Εργαστήριο Στοιχείων Μηχανών** N.T.U.A.- School of Mechanical Engineering Laboratory of Machine Elements
Ημερομηνία *Date* **12/6/2013**	**Υπογραφή** *Signature*

Fig. 2. Certificate of training as Safety Adviser for the transport of dangerous goods (https://www.i-consulting.gr/symvoyloy-asfaloys-metaforas-epikindynon-emporeymaton-s-a-m-e-e/)

6.3 Certification of driver

6.3.1 Driving training by educational organizations

In Greece, the training is done by Professional Training Schools for Drivers of Dangerous Goods Transport Vehicles (SECOMME) and in cooperation with the Ministry of Transport and Communications, they conduct examinations for the acquisition of a 5-year validity certificate of professional training which is mandatory for professional drivers of the transport of dangerous goods.

The trainers who approved by educational organizations or companies must be mechanical or chemical engineers and have attended the relevant training programs in schools or businesses respectively. In order to be able to participate in the exams, requires the successful completion of the relative teaching hours , from 18 to 46 hours depending on the specialty. There are a total of eight ADR Certification Categories which are denoted by the symbol “P”. The categories of ADR diplomas differ according to the class of the transported substance, so and the educational programs. According to No. A140/19672/2813/28-03-2014/ADA: VIXX1-ITY circular of Ministry of Infrastructure and Transport the questions of the written examination of driver candidates for the initial granting and renewal of professional training certificates (ADR) are selected after 01/09/2014 exclusively from the manual of the Ministry of Infrastructure, Transport & Networks "Road transport of dangerous goods" [ISBN: 978-960-87771-7-0] and according to the following:

Certification category	**Educational Programs and the corresponding parts of the manual**				**Set of exam questions**	**Transported Dangerous Goods**
	Part A’ Basic Education	**Part B’ Tanker truck transport**	**Part C’ Explosive materials (Class 1)**	**Part D’ Radioactive material (Class 7)**		
P1	√				25	Packaged dangerous goods of all classes except

						explosive & radioactive
P2	√		√		25 & 15	Packaged dangerous goods except radioactive
P3	√			√	25 & 15	Packaged dangerous goods except explosives
P4	√		√	√	25 & 15 & 15	Packaged dangerous goods of all classes
P5	√	√			25 & 15	Packaged and transport via tanker truck except explosives & radioactive
P6	√	√	√		25 & 15 & 15	Packaged and transport via tanker truck except radioactive
P7	√	√		√	25 & 15 & 15	Packaged and transport via tanker truck

						except explosives
P8	√	√	√	√	25 & 15 & 15 &15	Packaged and transport via tanker truck of all classes.

Table 5. Educational Programs depending on the ADR driving certificate category

Educational Programs	Subject Units	Minimum duration of initial training (teaching hours)	Minimum duration of refresher training (teaching hours)
Part A' Basic Education (theoretical part)	Part 8.2.2.3.2 of the ADR	18	8
Part A' (practical part)	First aid	2	1
	firefighting and actions in case of an unexpected event or accident	3	1
Part B' Tanker truck transport	Part 8.2.2.3.3 of the ADR	12	3
Part C' Explosive materials (Class 1)	Part 8.2.2.3.4. of the ADR	8	2
Part D' Radioactive material (Class 7)	Part 8.2.2.3.5. of the ADR	8	2

Table 6. Details of educational programs for ADR driving certificate

- Part A': Main- basic training

-Basic informations

This provides information about the ADR Agreement and exceptions of this as well as legislation governing the transport of dangerous goods.

-Classification of dangerous goods

In this described the classes of dangerous goods in which they are classified as well as the identification code numbers of them

-General risk characteristics

This section describes the general risk characteristics of all classes of dangerous goods

-Accompanying transport documents

The accompanying transport documents are described, such as the transport document, the accident report, the ADR approval certificate and the driver's professional training certificate.

-Ways of transporting dangerous goods – Packaging

Describes the different ways of transport of dangerous goods, the details of drums and general packing conditions. Special and general provisions concerning the loading, unloading and handling of dangerous goods and for various classes of materials are given.

-Safe vehicles transporting - stowage of goods

The road vehicles for the transport of dangerous goods are described, as well as the vehicle type approval required for the transport of these and the safety facilities are given. The basic principles are described regarding the behavior of the vehicle and the load it carries during its movement and principles for the stacking of goods and rules for securing loads.

-Marking of tanker vehicles

The warning signs for the identification of the transported material, the danger labels, the code numbers for the identification of the transported material and the orange plates that must be carried by the drums are described.

-Prevention and treatment of accidents

the basic rules for the prevention of accidents and environmental protection are given, examples of compliance of safety rules, instructions for dealing with accidents, the equipment for the transport, ways to deal with leakage or burning of a dangerous material and providing first aid.

-Responsibilities of those involved

The responsibilities of all persons involved in the transport of dangerous goods are described in detail.

- Part B’: Special training for tanker truck transport

It's obligatory to have completed the basic training. This aims to infom about the types and mode of operation of the tankers, the technical specifications and condition inspection, markings, loading and unloading rules and the requisite driving handling of these vehicles.

- Part C': Special training for explosive materials (class 1)

Here the completion of basic training it's necessary condition for this course. This includes knowledge of everything related to the loading and road transport of class 1 goods, such as the risks, methods of prevention and handling, the special marking

- Part D': Special education for radioactive material (class 7)

It is the same as above, with the difference that here we transport class 7 goods.

- Repetitive education:

It is designed for those who want to renew their ADR certificate after its 5 year expiry.

The exams are divided into:

-Examinations in basic training.

Candidates are examined in writing on an examination sheet which includes five (25) multiple choice questions. The candidate who correctly answers at least twenty-one (21) of the twenty-five (25) questions is considered successful. The duration of the exams is forty-five (45) minutes.

-Examinations in the special training for tanks / class 1 / class 7. A prerequisite for participation in these examinations is the passing of the basic training examination. Candidates are examined in writing on an examination paper which includes fifteen (15) multiple-choice questions. The candidate who correctly answers at least twelve (12) of the fifteen (15) questions is considered successful. The duration of the exams is thirty (30) minutes.

-Renewal exams

A condition for participation in renewal exams is the possession of a valid certificate. In the event that the driver does not renew the validity of his certificate within its validity period, he is obliged to participate in an initial training and examination program. Candidates are examined in writing on an examination paper which includes fifteen (15) multiple-choice questions. It is considered successful the candidate who correctly answers at least twelve (1) of the fifteen (15) questions The duration of the exams is thirty (30) minutes.

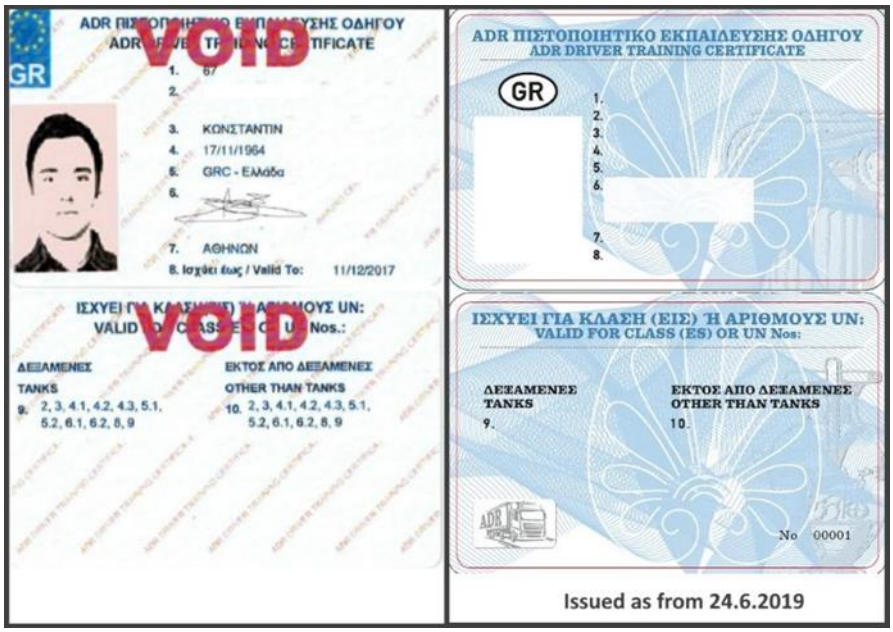


Fig. 3. ADR driving training certificate (https://sxoliadr.gr/diplomaadraxd.html)

6.3.2 Driving training by companies

Q&S (Quality & Safety Ltd)

Founded in 2001 in Greece, leads the market in the Development and Implementation of Road Safety Systems for the Road Transportation Sector. Certified with ISO 9001:2015, ISO 39001:2012 for Road Traffic Safety Management and ISO 29993:2017 for provision of Driver Training Services provides consulting services and international standard driver training programs to both Greek and Multinational companies operating locally, in 6 European countries, Saudi Arabia and Abu Dhabi.

It offers the expertise, processes and procedures necessary for the successful implementation of a Road Safety System that complies with international best practice, local legislature and the Client/Company's Corporate Road Safety Policy.

All the training programs and services are provided exclusively by experienced training team, accredited by leading European Road Safety Training Organizations. Is the only company in Southern Europe accredited as an Official Training Center by IAM UK and for Greece by MAN Germany, as an official training company for the "PROFIDRIVE" Safety and Economy Training program. It is accredited by Test and Training (Austria) to provide the Anti-Skid/Anti-Rollover training program and MPQC UK (Mineral Products Qualification Council) to provide training programs for project machinery operators. He is also a member of the European Road Safety Charter and the Panos Mylonas Road Safety Institute.

Candidates	Drivers who transport dangerous goods (all classes)
Objective	Candidates will be taught the laws and regulations regarding the transport of dangerous goods and will be adequately prepared for the written examination for ADR certification.
Training Programs	1. Basic Training (Mandatory) Duration: twenty (20) teaching hours, 45 minutes each. Number of questions: twenty five (25) Mistakes permitted: four (4) The "Basic Training" program is comprised of twenty (20) teaching hours, eighteen (18) of which are theory and two (2) of which are practical sessions. 2. Transport to Storage Tanks Duration: Twelve (12) teaching hours, 45 minutes each. Number of questions: fifteen (15) Mistakes permitted: three (3) 3. Explosive Materials Duration: eight (8) teaching hours, 45 minutes each. Number of questions: fifteen (15) Mistakes permitted: three (3) 4. Radioactive Materials Duration: eight (8) teaching hours, 45 minutes each. Number of questions: fifteen (15) Mistakes permitted: three (3)

Table 7. Details of driving training program by Q&S company

6.4 Certification of inspector at Vehicle Technical Inspection Centers (KTEO)

Vehicles transporting dangerous goods shall be subject to an annual technical inspection in their country of registration to make sure that they conform to the relevant requirements of this Part, and to the general safety regulations (concerning brakes, lighting, etc.) in force in their country of registration. The conformity of the vehicle shall be certified either by the extension of validity of the certificate of approval or by the issue of a new certificate of approval in accordance with 9.1.3

For the certification of the staff for inspection at Public and Private Vehicle Technical Inspection Centers (KTEO), a Certificate inspector of KTEO is issued.

As technical responsible of these Centers and inspectors are defined persons who have

a. Diploma in Engineering, specialty: Mechanical Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mining and Metallurgical Engineering, Naval Engineering, Environmental Engineering, Mineral Resources Engineering, Production Engineering and Management, and are members of the Technical Chamber of Greece.

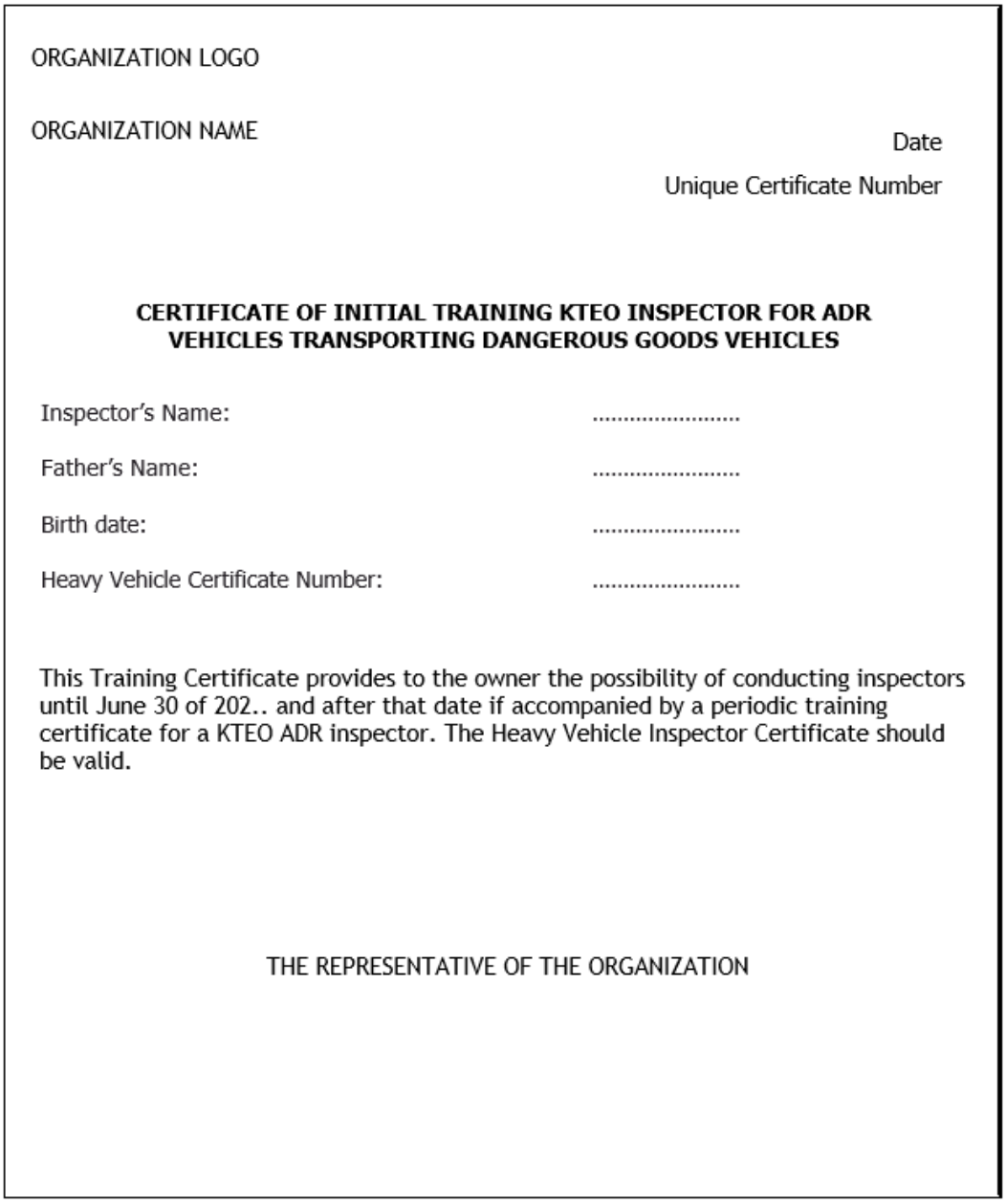
b. Degree in Engineering of technological education, specialty: Mechanical Engineering, Vehicle Mechanics, Electrical Engineering, Naval Engineering, Automation Engineer, Oil and Gas Technology Engineer, Energy Technology Engineer.

Inspectors are persons with the above diploma or diploma if they meet at least one of the following conditions:

a. Have carried out fifteen (15) tank inspections to an ADR inspection body guided by an experienced inspector and certified by the technical manager of the organization in which they were conducted. Inspection certificates issued shall record the name and surname of the apprentice. The certificate of the technical officer contains the dates of the inspections, the serial numbers of the certificates, the unique number of the inspector assigned by the Ministry at the request of the institution and kept in the archive of the institution.

b. Have attended a training program of at least one hundred (100) hours which will include a theoretical and practical part, on the subject of the ADR Agreement, the applicable standards and inspections of tanks transporting dangerous goods, and have passed relevant examinations. The certificate of successful attendance of the program is kept in the archives of the institution. The inspectors in this case are also assigned a unique number by the Ministry at the request of the body.

c. They have been certified as ADR experts in accordance with No. 32591/3257/2001 (B' 703) ministerial decision. The decision of the Ministry of Infrastructure and Transport certifying the inspector as an ADR expert is kept in the archive of the operator.



ORGANIZATION LOGO

ORGANIZATION NAME

Date

Unique Certificate Number

CERTIFICATE OF INITIAL TRAINING KTEO INSPECTOR FOR ADR VEHICLES TRANSPORTING DANGEROUS GOODS VEHICLES

Inspector's Name: .....

Father's Name: .....

Birth date: .....

Heavy Vehicle Certificate Number: .....

This Training Certificate provides to the owner the possibility of conducting inspectors until June 30 of 202.. and after that date if accompanied by a periodic training certificate for a KTEO ADR inspector. The Heavy Vehicle Inspector Certificate should be valid.

THE REPRESENTATIVE OF THE ORGANIZATION

Fig. 4. Template of certificate about initial training KTEO inspector for ADR vehicles

The certificates are issued after following an appropriate training program and relevant exams by training bodies (University Laboratories) which have been approved by the Ministry of Infrastructure and Transport. The website of the Ministry provides information on the training institutions for KTEO inspectors and the links which

interested parties can find everything about the programs, the dates, the way of training and examination and the cost of them.

The ADR and ATP initial training programs for KTEO inspectors are aimed at acquiring the required knowledge and skills to conduct inspections in accordance with current legislation. The ADR program is divided into a theoretical part of a minimum duration of twenty-four (24) hours, a practical exercise of a minimum duration of six (6) hours and includes the following thematic sections

- THEMATIC UNITS OF ADR INITIAL TRAINING PROGRAM

  Introduction to the ADR Agreement - Basic Concepts

  Requirements of ADR Parties:

  Part 1 (definitions, transitional provisions)

  Part 2 (classification of materials)

  Part 3 (list of substances/explanation of columns)

  Part 4 (tank coding)

  Part 6 (tank construction, inspections, marking, standards)

  Part 9 (specifications by vehicle category)

  Classification of ADR vehicles (legislation, procedures)

  ADR control bodies – Test certificates (legislation, procedures)

  ADR vehicle inspection at the KTEO (legislation, procedures, supporting documents, checkpoints, ADR vehicle approval certificate information system)

  ADR vehicle approval certificate (completion instructions)

  Practical exercise in a FL and EX/II or EX/III tank truck

  Summary- Solving queries

The initial ADR training exam includes thirty (30) questions and lasts sixty (60) minutes per hour. The ATP initial training exam consists of twenty (20) questions and lasts forty (40) minutes per hour. The periodic ADR training exam lasts forty (40) minutes of the hour and includes fifteen (15) questions with content mainly on the changes that have occurred with the most recent ADR Agreement and related legislation. Candidates who have correctly answered at least twenty-four (24) questions are considered successful in the ADR initial training exam. The order of questions is random and different for each candidate

Inspectors, in addition to the initial training, are obliged to attend a corresponding periodical training program every two years, due to changes in the legislation and technical changes in the vehicles. The periodic training programs of ADR and ATP of KTEO Inspectors are aimed at updating the knowledge of the participants for the correct handling of the audits in accordance with the current legislation. The ADR program includes the following thematic sections and has a minimum duration of ten (10) hours.

- THEMATIC UNITS OF ADR PERIODIC TRAINING PROGRAM

  ADR agreement (changes concerning vehicles and tanks)

  Classification of ADR vehicles (changes in legislation, procedures)

  ADR control bodies – Test certificates (changes in legislation, procedures)

  ADR vehicle inspection at the KTEO (changes in legislation, procedures, supporting documents, checkpoints, ADR vehicle approval certificate information system)

  Summary - Solving questions - Exchange of views

The ATP periodic training exam lasts thirty (30) minutes of the hour and includes ten (10) questions with content mainly on the changes that have occurred with the most recent ATP Agreement and the relevant legislation. Candidates who have correctly answered at least sixteen (16) questions are considered successful in the ATP initial training exam.

Competent bodies for training KTEO inspectors for vehicles transporting dangerous goods (ADR) and perishable food (ATP) in our country:

A. Vehicle Laboratory of the School of Mechanical Engineering of the National Technical University of Athens (NTUA), No. 142129/05.05.2023 decision of the General Director of Transport. Information about the seminars can be found at the link: https://e-learning.ntua.gr/programs/training-evaluation-of-public-private-kteo-audit-staff-for-conduct-of-inspections-on-vehicles-for-transport-of-dangerous-goods-and-perishable-foodstuffs/

Program oftraining & evaluation of public and private kteo auditing staff for the performance of checks on vehicles transporting dangerous goods and perishable food

This program provides Heavy Vehicle Inspection Officers with the necessary skills to carry out inspections on heavy vehicles transporting (a) dangerous goods (ADR) and (b) perishable food (ATP).

B. Laboratory of Machine Components and Mechanical Design of the Department of Mechanical Engineering of the Polytechnic School of the Aristotle University of Thessaloniki (AUTH), No. 142106/05.05.2023 decision of the General Director of Transport. Information about the seminars can be found at the link: https://lmemd.meng.auth.gr/new_wordpress/trainings/

C. Laboratory for the Study, Planning, Supervision, Measurement of Energy Performance of Thermal and Related Environmental Facilities of the General Department of the National and Kapodistrian University of Athens (EKPA), No. 142298/05.05.2023 decision of the General Director of Transport. Information about the seminars can be found at the link: http://kteotraining.core.uoa.gr/index.html

The Education and Lifelong Learning Center (KEDIBIM) of both AUTH and NTUA are independent academic units of the University, responsible for the organization of all kinds of educational and training programs. The successful completion of the programs leads to the granting of a Certificate of Training or Specialized Training or a Certificate of Attendance, while it is possible to provide a Supplemental Certificate. In July 2023, took place the training programs entitled "Periodical training of inspectors of public and private KTEO vehicles for the transport of dangerous goods ADR and perishable food ATP", Training & Evaluation of Public and Private KTEO Audit Personnel for Carrying Out Controls in Vehicles for the Transport of Dangerous Goods and Perishable Foods (B Circle).

7. Exemptions

7.1 ADR Exemptions (ADR 1.1.3)

The following activities are exempt and therefore not subject to the ADR or national regulations:

(a) The carriage of dangerous goods by private individuals where the goods in question are packaged for retail sale and are intended for personal or domestic use, leisure or sporting activities. When carrying flammable liquids in refillable receptacles, the total quantity cannot exceed 60 litres per receptacle or 240 litres per transport unit

(b) The carriage of machinery or equipment not specified in ADR (you may need confirmation from a DGSA) which happen to contain dangerous goods in their internal or operational equipment, provided that measures have been taken to prevent any leakage of contents in normal conditions of carriage (e.g. transporting old fridges which contain refrigerant gases)

(c) The carriage undertaken by enterprises which is ancillary to their main activity, such as deliveries to or returns from building or civil engineering sites, or in relation to surveying, repairs and maintenance, in quantities of not more than 450 litres per packaging and within the maximum quantities specified in ADR 1.1.3.6 (small load exemptions, Section 5.2). Measures must be taken to prevent any leakage of contents in normal conditions of carriage. These exemptions do not apply to Class 7 (radioactive materials). This exemption is not available for transport (supply and distribution) or courier companies, irrespective of the quantity of dangerous goods.

(d) The carriage of uncleaned empty static storage vessels which have contained gases of Class 2, groups A (asphyxiant), O (oxidizing) or F (flammable); substances of Class 3, flammable liquids or Class 9, miscellaneous dangerous substances belonging to packing group II or III (e.g. environmentally hazardous substances); or pesticides of Class 6.1, toxic substances belonging to packing group II or III, subject to the following conditions: All openings with the exception of pressure relief devices (when fitted) are hermetically closed. Measures have been taken to prevent any leakage of contents in normal conditions of carriage.

The load is fixed in cradles or crates or other handling devices or to the vehicle or container in such a way that it will not become loose or shift during normal conditions of carriage. This exemption does not apply to static storage vessels which have contained desensitized explosives or substances the carriage of which is prohibited by ADR

(e) Carriage of gases

• Gases contained in the tanks of a vehicle performing a transport operation and destined for its propulsion or for the operation of any of its equipment (e.g. refrigerating equipment).

• Gases contained in the fuel tanks of vehicles transported. The fuel cock between gas tank and engine must be closed and the electric contact open.

• Gases of Groups A and O (according to ADR 2.2.2.1), if the pressure of the gas in the receptacle or tank at a temperature of 20°C does not exceed 200 kPa (2 bar) and if the gas is not a liquefied or a refrigerated liquefied gas. This includes every kind of receptacle or tank (e.g. also parts of machinery and apparatus).

• Gases contained in the equipment used for the operation of the vehicle (e.g. fire extinguishers), including in spare parts (e.g. inflated pneumatic tyres) this exemption also applies to inflated pneumatic tyres carried as a load.

• Gases contained in the special equipment of vehicles and necessary for the operation of this special equipment during transport (cooling systems, fishtanks, heaters, etc.) as well as spare receptacles for such equipment or uncleaned empty exchange receptacles, transported in the same transport unit.

• Gases contained in foodstuffs (except UN 1950 aerosols), including carbonated beverages.

• Gases contained in balls intended for use in sports.

• Gases contained in light bulbs provided they are packaged so that the projectile effects of any rupture of the bulb will be contained within the package.

(f) Carriage of liquid fuels

• Fuel contained in the tanks of a vehicle performing a transport operation and destined for its propulsion or for the operation of any of its equipment. The fuel may be carried in fixed fuel tanks which are directly connected to the vehicle’s engine and/or auxiliary equipment and which comply with the pertinent legal provisions, or may be carried in

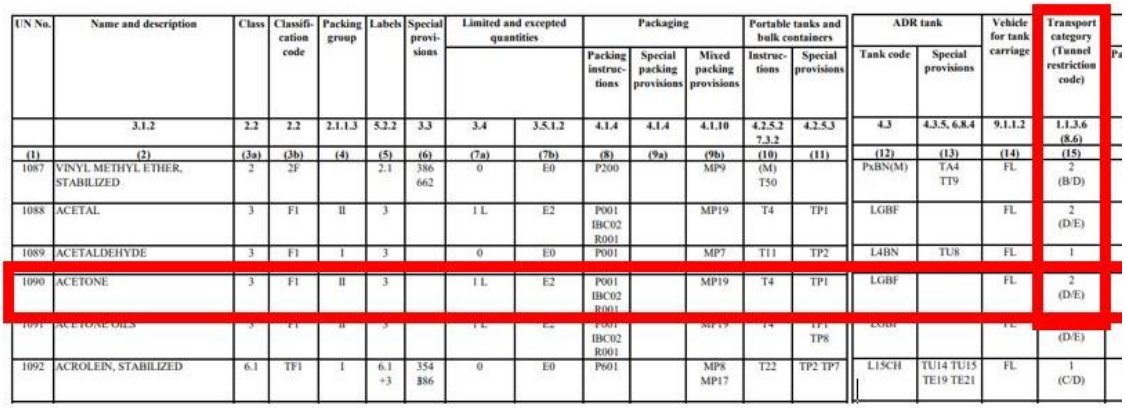
portable fuel containers (such as jerricans). The total capacity of the fixed tanks must not exceed 1,500 litres per transport unit and the capacity of a tank fitted to a trailer must not exceed 500 litres. A maximum of 60 litres per transport unit may be carried in portable fuel containers. These restrictions must not apply to vehicles operated by the emergency services.

• Fuel contained in the tanks of vehicles or of other means of conveyance (such as boats) which are carried as a load, where it is destined for their propulsion or the operation of any of their equipment. Any fuel cocks between the engine or equipment and the fuel tank must be closed during carriage unless it is essential for the equipment to remain operational. Where appropriate, the vehicles or other means of conveyance must be loaded upright and secured against falling.

7.2 Small load (packages) exemptions

Small load exemptions relate to the total quantity of dangerous goods carried in packages by the "transport unit". It allows the transport of a specified amount of dangerous goods in packages with the application of minimal requirements only.

It is the Transport Category (TC) that determines the load limits (thresholds) where exemptions can be claimed. The column 15 of Table A at ADR lists both the 'Transport Category', as well as the 'Tunnel Restriction Code'. In the below example, the Acetone - UN1090 referred as Transport Category 2.



UN No.	Name and description	Class	Classification code	Packing group	Labels	Special provisions	Limited and excepted quantities		Packaging			Portable tanks and bulk containers		ADR tank		Vehicle for tank carriage	Transport category (Tunnel restriction code)
									Packing instructions	Special packing provisions	Mixed packing provisions	Instructions	Special provisions	Tank code	Special provisions		
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4	3.5.1.2	4.1.4	4.1.4	4.1.10	4.2.5.2 7.3.2	4.2.5.3	4.3	4.3.5, 6.8.4	9.1.1.2	1.1.3.6 (8.6)
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)
1087	VINYL METHYL ETHER, STABILIZED	2	2F		2.1	386 662	0	E0	P200		MP9	(M) T50		PxBN(M)	TA4 TT9	FL	2 (B/D)
1088	ACETAL	3	F1	II	3		1 L	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		FL	2 (D/E)
1089	ACETALDEHYDE	3	F1	I	3		0	E0	P001		MP7	T11	TP2	L4BN	TU8	FL	1
1090	ACETONE	3	F1	II	3		1 L	E2	P001 IBC02 R001		MP19	T4	TP1	LGBF		FL	2 (D/E)
1091	ACETONE OILS	3	F1	II	3		1 L	E2	P001 IBC02 R001		MP19	T4	TP1 TP8	LGBF		FL	2 (D/E)
1092	ACROLEIN, STABILIZED	6.1	TF1	I	6.1 +3	354 386	0	E0	P601		MP8 MP17	T22	TP2 TP7	L15CH	TU14 TU15 TE19 TE21	FL	1 (C/D)

Fig. 5a. The transport category of Acetone as example in column 15 in Table A of ADR

If the dangerous goods carried in the transport unit belong to the same 'transport category' as provided in first column of table below, then the maximum total quantity which can be carried per transport unit under this exemption is indicated in third column of the table (ADR 1.1.3.6.3).

Transport category	Substances or articles packing group or classification code/group or UN No.	Maximum total quantity per transport unit
0	Class 1: 1.1A/1.1L/1.2L/1.3L and UN No. 0190 Class 3: UN No. 3343 Class 4.2: Substances belonging to packing group I Class 4.3: UN Nos. 1183, 1242, 1295, 1340, 1390, 1403, 1928, 2813, 2965, 2968, 2988, 3129, 3130, 3131, 3134, 3148, 3396, 3398 and 3399 Class 5.1: UN No. 2426 Class 6.1: UN Nos. 1051, 1600, 1613, 1614, 2312, 3250 and 3294 Class 6.2: UN Nos. 2814 and 2900 Class 7: UN Nos. 2912 to 2919, 2977, 2978 and 3321 to 3333 Class 8: UN No. 2215 (MALEIC ANHYDRIDE, MOLTEN) Class 9: UN Nos. 2315, 3151, 3152 and 3432 and articles containing such substances or mixtures and empty uncleaned packagings, except those classified under UN No. 2908, having contained substances classified in this transport category.	0

1	Substances and articles belonging to packing group I and not classified in transport category 0 and substances and articles of the following classes: Class 1: 1.1B to 1.1J***** /1.2B to 1.2J/1.3C/1.3G/1.3H/1.3J/1.5D ***** Class 2: groups T, TC *****, TO, TF, TOC ***** and TFC aerosols: groups C, CO, FC, T, TF, TC, TO, TFC and TOC chemicals under pressure: UN Nos. 3502, 3503, 3504 and 3505 Class 4.1: UN Nos. 3221 to 3224, 3231 to 3240, 3533 and 3534 Class 5.2: UN Nos. 3101 to 3104 and 3111 to 3120	20
2	Substances belonging to packing group II and not classified in transport categories 0, 1 or 4 and substances and articles of the following classes: Class 1: 1.4B to 1.4G and 1.6N Class 2: group F aerosols: group F chemicals under pressure: UN No. 3501 Class 4.1: UN Nos. 3225 to 3230, 3531 and 3532 Class 4.3: UN Nos. 3292 Class 5.1: UN Nos. 3356 Class 5.2: UN Nos. 3105 to 3110 Class 6.1: UN Nos. 1700, 2016 and 2017 and substances belonging to packing group III Class 9: UN No. 3090, 3091, 3245, 3480 and 3481	333
3	Substances belonging to packing group III and not classified in transport categories 0, 2 or 4 and substances and articles of the following classes: Class 2: groups A and O aerosols: groups A and O chemicals under pressure: UN No. 3500 Class 3: UN No. 3473 Class 4.3: UN No. 3476	1 000

	Class 8: UN No. 2794, 2795, 2800, 3028, 3477 and 3506 Class 9: UN No. 2990 and 3072	
4	Class 1: 1.4S Class 4.1: UN Nos. 1331, 1345, 1944, 1945, 2254 and 2623 Class 4.2: UN Nos. 1361 and 1362 packing group III Class 7: UN Nos. 2908 to 2911 Class 9: UN Nos. 3268, 3499, 3508 and 3509 and empty, uncleaned packagings having contained dangerous goods, except for those classified in transport category 0	unlimited

***** For UN No. 0081, 0082, 0084, 0241, 0331, 0332, 0482, 1005 and 1017, the total maximum quantity per transport unit shall be 50 kg

Table 8. Exemptions related to quantities of individual goods or goods of the same transport category carried per transport unit

In the above table, "maximum total quantity per transport unit" means:

- For articles, gross mass in kilograms (for articles of Class 1, net mass in kilograms of the explosive substance; for dangerous goods in machinery and equipment specified in this Annex, the total quantity of dangerous goods contained therein in kilograms or litres as appropriate).
- For solids, liquefied gases, refrigerated liquefied gases and dissolved gases, net mass in kilograms.
- For liquids, the total quantity of dangerous goods contained in litres.
- For compressed gases, adsorbed gases and chemicals under pressure, the water capacity of the receptacle in litres.

When carrying goods of different transport categories in the same transport unit, the exemption applies if the sum of goods carried does not exceed 1,000 units. However, each category must also be multiplied by the appropriate multiplying factor before adding the calculated value of each category together, as provided below.

Transport category	Multiplying Factor
1	50
1*	20
2	3
3	1
Sum of the 'calculated value' of the dangerous goods must not exceed 1,000	

* For UN Nos. 0081, 0082, 0084, 0241, 0331, 0332, 0482, 1005 and 1017

Table 9. Calculated values in case of carrying goods from different transport categories

7.3 Limited quantities (LQ) exemptions

Limited Quantities (LQ) is a term from the dangerous goods regulations and means that for dangerous goods, which do not exceed certain quantity limits per inner packaging, relief from the regulations of the dangerous goods regulations can be used.

LQ standards for Limited Quantities and many household goods such as paints, aerosols and cleaning products, despite being classified as Dangerous Goods can be transported using the Limited Quantities provisions. These provisions state that certain Dangerous Goods may carry a lower risk to the general public in the event of an incident if they are packaged in a certain way and in smaller containers, hence the term "Limited Quantity"

For something to qualify as LQ it must meet several criteria. Different UN numbers have different limits for LQ with some UN numbers having no LQ limit at all. Under ADR each UN number will have an inner pack size limit which will range from zero (does not qualify for LQ) up to 5 litres for liquids and 5 kg for solids. Anything above these limits cannot possibly be carried as LQ. The ADR, Chapter 3.2, Table A, Column 7(a), provides the applicable quantity limit of the inner packaging beneath which the substance could be carried under this exemption.

UN number	Naming and describing	Class	Classification code	Packing group	Hazard label	Special provisions	Limited and excepted quantities	
	3.1.2	2.2	2.2	2.1.1.3	5.2.2	3.3	3.4/3	5.1.2
(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)
1090	ACETONE	3	F1	II	3		1 L	E2

Fig 5b. The quantity limit of the inner packaging of Acetone as example in column 7a in Table A of ADR

The ADR regulations then state these containers need to be double packed for transport. So for aerosols for example the individual canisters must be placed in a box or shrink-wrap tray not exceeding 30kg (20kg if the outer packaging is a shrink wrap tray). Goods that are classified as LQ must be labelled accordingly with the label applied on at least one side, or one end, of the outer packaging.

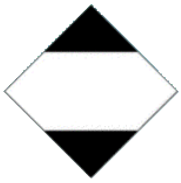


Fig. 6. Marking of packages containing limited quantities

Transport units over 12 tones (gross vehicle mass), carrying more than 8 tones of limited quantity packages must display the mark indicated in the form of a placard (large label or placard dimensions should be 250 mm x 250 mm). If the vehicle requires the ADR blank orange plate marking because of other dangerous goods being carried then the LQ placards are not required.

For further advice on limited quantities, you should consult a DGSA.

The limited quantity is the maximum quantity per inner packaging or article for the transport of dangerous goods in limited quantities and is subject to these regulations:

- The dangerous goods must not exceed the Limited Quantity defined for the UN number.
- The dangerous goods must be packed in an inner and outer packaging

- The packaging does not have to have design approval, but must protect the goods from damage during transport
- The total gross mass of the package must not exceed 30 kg, the total gross mass of trays must not exceed 20 kg
- The outer packaging must bear a marking for limited quantities
- The transport document must contain the entry “Dangerous goods in limited quantity + gross weight”.
- People who dealing with LQ must be ADR aware

7.4 Excepted quantity exemptions

The excepted quantities exemption is similar to the limited quantity exemption, but it is only for certain dangerous goods in very small quantities. Once you have complied with the basic training requirements, classification procedures and packaging, labelling and quantity limitations, no other provisions apply to the transport of dangerous goods in excepted quantities. ADR specifies an “E code” for all dangerous goods in Chapter 3.2, Table A, Column 7(b), which specifies the excepted quantities for outer and inner packaging, indicated in Table below.

Code	Maximum net quantity per inner packaging (in grams for solids and ml for liquids and gases)	Maximum net quantity per outer packaging (in grams for solids and ml for liquids and gases, or sum of grams and ml in the case of mixed packing)
E0	Not permitted as excepted quantity	
E1	30	1,000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

Table 10. Excepted quantities: maximum net quantities

Code E0 means that no EQ provisions are applicable. Code E1 means that the substance may be carried in inner packaging up to 30g or 30ml in outer packaging with maximum net contents of 1000g or 1000ml – and so on for the other codes.

Packages must consist of an inner packaging placed in an intermediate packaging, securely packed with cushioning and then placed in a suitable rigid strong outer packaging. If documents (for example, a consignment note) accompany dangerous goods in excepted quantities, at least one of the documents must include the statement “dangerous goods in excepted quantities” and indicate the number of packages.

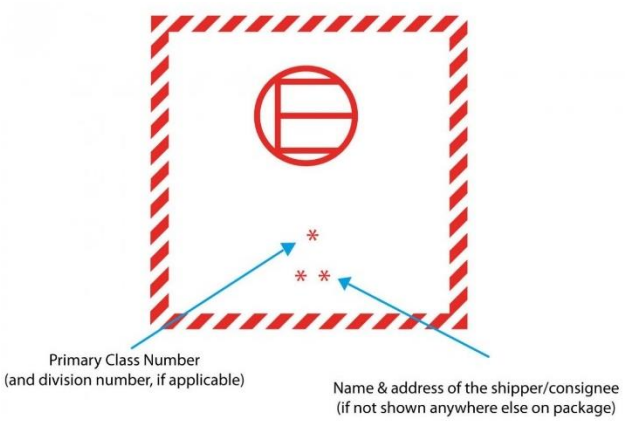


Fig. 7. Marking of packages containing excepted quantities

8. Hazard goods classifications

8.1 Principles of classification

The classification or identification of dangerous goods is the most important step in the transport chain. In order to establish how dangerous goods can be transported safely you must firstly establish what it is you are dealing with as different dangerous goods require different measures to ensure their safe transport. Dangerous goods must be classified in accordance with the requirements in ADR and assigned a UN (United Nations) number, name, description and packing group (where appropriate) as indicated in the Dangerous Goods list in ADR. They are therefore assigned to different classes depending on their predominant hazard which can be seen below. For packing purposes, certain substances are assigned a packing group:

Packing Group I - substances presenting a high danger

Packing Group II - substances presenting a medium danger

Packing Group III - substances presenting a low danger

The UN Model Regulations use a classification system in which each dangerous substance or article is assigned to a class depending upon the nature of the danger it presents. There are, as can be seen above, 9 Classes, which are subdivided as detailed below.

UN Class	Dangerous Goods	Division(s)	Classification	Examples
1	Explosives	1.1	Mass explosion hazard	Dynamite
		1.2	Projection hazard	Flares
		1.3	Fire hazard	Display Fireworks
		1.4	No significant blast hazard	Ammunition
		1.5	Blasting agents	Blasting Agents

		1.6	Detonating substances	Explosive Devices
2	Gases	2.1	Flammable gases	Propane
		2.2	Non-flammable, non-toxic gases	Helium
		2.3	Toxic gases	Fluorine, Compressed
3	Flammable liquids	3	Flammable liquids	Gasoline
4	Flammable solids	4.1	Flammable solids	Ammonium
		4.2	Spontaneously combustible substances	Picrate, Wetted
		4.3	Substances which in contact with water emits flammable gas	White Phosphorous Sodium
5	Oxidizing substances & Organic peroxides	5.1	Oxidising substances	Ammonium Nitrate
		5.2	Organic peroxides	Methyl Ethyl Ketone Peroxide
6	Toxic substances & Infectious substance	6.1	Toxic substances	Potassium Cyanide
		6.2	Infectious substances	Anthrax Virus
7	Radioactive materials	7	Radioactive materials	Uranium

8	Corrosive substances	8	Corrosive substances	Battery Fluid
9	Miscellaneous dangerous goods	9	Miscellaneous dangerous goods	Polychlorinated Biphenyls (PCB)

Table 11. Classification of Dangerous Goods by UN Model

8.1.1 Class 1 – Explosives

Although explosives can behave in a violent way when suitably initiated, they are designed to be quite stable and insensitive under normal surface conditions. This means that they can be handled and transported by land and sea quite safely, so long as they are not subjected to violent shock, as in a high-speed traffic accident, or worse, allowed to heat up in a fire. There are 6 divisions in Class 1, the divisions show how the explosives will react and behave when initiated. The items are also assigned one of 13 Compatibility Group letters, basically to indicate which types may travel safely with which. Explosives are declared as NEQ (Net Explosive Quantity) when described in the transport document, separate to the gross weight.

Division 1.1 – Mass explosion hazard

Division 1.2 – Projection hazard only

Division 1.3 – Fire hazard, minor explosion or minor projection hazard

Division 1.4 – Minimal hazard

Division 1.5 – Blasting agents

Division 1.6 – Very insensitive detonating articles

Fig. 8. UN Hazard Warning Diamonds for Class 1

8.1.2 Class 2 – Gases

Gases are mostly carried under pressure to reduce their volume, and as a result, also save space in transport and storage. This pressure itself creates a danger if it is released

suddenly. The pressure never dissipates, unlike heat, which is transferred to or from the surroundings until a uniform temperature prevails.

Applying pressure to gases will reduce their volume, but if they turn to liquid under pressure, the volume is reduced much further several hundred times. Some gases liquefy under pressure at normal temperatures, e.g. the liquefied petroleum gases chlorine, ammonia.

But some, of the permanent gases, will only liquefy if they are also refrigerated down to very low (critical) temperatures, e.g. as low as - 269° C for liquid helium.

These include oxygen, nitrogen, hydrogen, helium, neon, and argon. Once liquefied, they have to be contained in special heavily insulated containers to prevent them from warming up. The extreme cold clearly creates a danger if cold metal, etc. is accidentally touched without protection. Also, an escape of very cold-gas creates a breathing danger, causing direct damage to the lungs, or to local oxygen starvation.

Division 2.1 – Flammable Gases

Division 2.2 – Non-flammable and non-toxic gases

Division 2.3 – Toxic-gases

Fig. 9. UN Hazard Warning Diamonds for Class 2

8.1.3 Class 3 – Flammable liquids

Some flammable liquids derive from petroleum, such as petrol and kerosene, whereas others are manufactured through natural or industrial processes such as alcohols. Vapours are created when some molecules in the liquid have sufficient energy and are moving with sufficient velocity to break clear of the surface into the air space above. The warmer the liquid, the more molecules reach this energy and velocity level, and the faster the vapor is formed. The vapours are invisible, and always much heavier than air. They will flow downhill and collect at the lowest point. Flammable liquids are placed in Packing Groups according to their boiling point and flashpoint.

PACKING GROUP	INITIAL BOILING POINT	FLASHPOINT (CLOSED CUP)
Packing Group I	The boiling point below 35°C	
Packing Group II	The boiling point above 35°C	Flashpoint below 23°C
Packing Group III	The boiling point above 35°C	Flashpoint >23°C and < 60°C

Table 12. Flammable liquids are placed in Packing Groups according to their boiling point and flashpoint.

Fig. 10. UN Hazard Warning Diamonds for Class 3

8.1.4 Class 4 – Flammable solids

Class 4.1 – Flammable Solids

These will burn easily, more so than ordinary combustible materials such as wood and paper. The burning may be fierce and rapid, creating great heat. Some 4.1 are desensitized explosives, e.g. wetted trinitrotoluene (TNT) which would otherwise be in Class 1. Some are self-reactive, and are liable to break down chemically, if they get above a certain temperature, or are subjected to shock.

Class 4.2 – Spontaneously Combustible

Division 4.2 goods are either solids or liquids. They will ignite spontaneously in contact with oxygen. They must be kept in airtight packages or as liquids under inert gas or liquid blanket. Pyrophoric materials will ignite within five minutes of coming into contact with air and are always assigned to Packing Group I. Other materials will ignite only when in large amounts and after long periods of time. These are in Packing Group II or III, depending on classification tests

Class 4.3 – Dangerous When Wet

Division 4.3 goods react with water, either as a liquid or as vapor, and generate flammable gas. This can be ignited by the heat of the reaction. They must be kept in watertight containers, hermetically sealed to avoid the entry of moisture or water vapor.

Fig. 11. UN Hazard Warning Diamonds for Class 4

8.1.5 Class 5 – Oxidizing substances & Organic peroxides

Class 5.1 - Oxidizing substances

Because of their high oxygen content, these are often reactive materials. They may react with other flammable or combustible materials, and the heat generated may start the latter burning. The agents then supply the oxygen to keep them burning without any help from oxygen in the air, as is the case with normal combustion. Some oxidizers can be explosive if heated strongly, particularly in the presence of carbon. Ammonium nitrate mixed with hydrocarbon oil, e.g. diesel, becomes a powerful explosive, much used in the extractive industries, and by terrorists.

Class 5.2 – Organic Peroxides

The molecule contains structures containing carbon (organic) linked by a double oxygen bond (peroxide). Furthermore, the fuel and the oxygen are together in the same molecule, making them even more liable to ignition than a separate combustible material. They are designed to be reactive for a number of industrial purposes, and may consequently be unstable, and sometimes explosive. On the basis of their chemical structure alone, they could be considered as either. They often have to be maintained under refrigeration to keep them inactive, and then the temperature must be carefully controlled. Otherwise, if they exceed a certain temperature specific to the material, they will start to decompose rapidly, similar to the self-reactive materials in Class 4.1, resulting in uncontrollable progress towards fire or explosion. Because of their reactive nature, they can be very damaging to the human body, particularly the eyes.

Fig. 12. UN Hazard Warning Diamonds for Class 5

8.1.6 Class 6.1 – Toxic & Infectious substances

Class 6.1 – Toxic Substances

These are chemical poisons that can damage the human body, in whole or in part. They must not be allowed to get inside the body, through swallowing, breathing in, or by absorption through the skin. The toxics range in power from those which kill in minutes, e.g. the cyanides, to those which would injure but not necessarily kill, so long as the dose was not excessive, e.g. the chlorinated hydrocarbons toxics in Class 6.1 can be in solid or liquid form. Generally, 6.1 must not be carried with foodstuffs, however, there are exceptions.

Class 6.2 – Infectious Substances

Division 6.2 goods contain pathogens, i.e. micro-organisms that cause infectious disease in humans or animals. They are graded for danger for transport into one of three groups, of which only the first two are considered dangerous for transport on infectious grounds.

Fig. 13. UN Hazard Warning Diamonds for Class 6

8.1.7 Class 7 – Radioactive substances

These radioactive materials containing unstable atoms that change their structure spontaneously in a random way over some time period.

As each atom changes, they emit invisible radiation that may cause chemical or biological change-ionizing radiation. This can damage the body in some way or other, depending on the type of radiation, and the duration of the exposure.

Ionizing radiation is generally dangerous to the human body, depending on the type of radiation, the dose and the duration of the exposure.

Some radioactive materials may also have other hazardous properties, and packages may, therefore, carry other UN warning signs to indicate subsidiary risks. Radioactive packages are perfectly safe to handle and transport because the packaging acts as a shield.

The radiation level for excepted packages at the surface must be below 5 mSv/hour.

The Sievert symbol, Sv is a derived unit of ionizing radiation dose in the International System of Units (SI) and is a measure of the health effect of low levels of ionizing radiation on the human body.) The packages must be declared as radioactive on the declaration, but they do not need to be labelled. In default of other hazardous properties, they can be carried as ordinary goods.

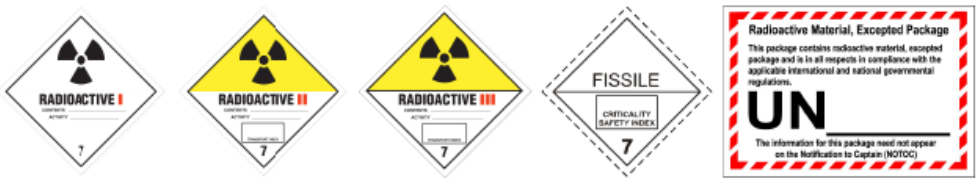


Fig. 14. UN Hazard Warning Diamonds for Class 7

8.1.8 Class 8 – Corrosive substances

These are highly reactive materials that produce positive chemical effects, resulting in changes in the affected materials. For this reason, corrosive are used extensively in industry to produce a wide range of transformations and effects. This active nature can obviously be very damaging to the body. They work from outside the body by destroying the tissue, in the opposite way to the toxics, which works from inside the body on the various organs and life systems.

Corrosives are described as either acids or alkalis. Acids react with metals which are generally strong and flexible, to produce salts, which can be fragile crystals that are soluble in water. Inorganic acids include, carboxylic, acetic, formic, and benzoic, and fatty acids like oleic, palmitic, and stearic. Common alkalis are sodium and potassium hydroxide, ammonium hydroxide. These are very corrosive to skin, eyes and mucous membranes. Alkalis neutralize acids, but the reaction may be strong and create a lot of heat very rapidly. This can cause the water in the solution to flash off to steam violently, throwing the material aside in a dangerous way.

Corrosives are placed in Packing Groups according to their ability to cause full thickness destruction of intact skin tissue within a certain observation period, starting after a certain exposure time, measured in minutes, hours, or days.

There are strict requirements on the carriage of acids & alkalis during Sea journeys (IMDG Regulations)

Fig. 15. UN Hazard Warning Diamonds for Class 8

8.1.9 Class 9 – Miscellaneous dangerous substances and articles

Class 9 covers substances and articles which during carriage, present a danger not covered by the heading of other classes. Such products have properties that cannot be included elsewhere in the UN Class system, or which have a number of disconnected dangers crossing two or more Class boundaries. The Class sign is unique in the UN system in that it gives no indication of the particular danger, which can only then be obtained from written information. There are two UN numbers in Class 9 for environmentally hazardous

materials. UN 3077 Environmentally Hazardous Substance Solid N.O.S and UN 3082 Environmentally Hazardous Substance Liquid N.O.S.

Hazardous Material includes a number of other products identified which may not be included in the above list of Classes 1 - 9. These are classified as "Obnoxious" and for the purposes of carriage would fall within Class 9. These include:

Animal waste, Refuse, Hospital waste, Pressurized gases, Pressurized liquids, Asbestos

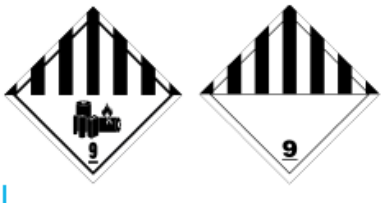


Fig. 16. UN Hazard Warning Diamonds for Class 9

9. Packaging

Packaging means a receptacle and any other components or materials necessary for the receptacle to perform its containment function in conformance with the minimum packing requirements of the ADR. Examples of packagings include Fiberboard boxes, Drums, Portable tanks, Cargo. Package or outside package means a packaging plus its contents (in other words, the material it contains).

Fig. 17. The difference between Non-bulk and Bulk Packaging (Hazardous Materials Regulations 3.0 Packaging Student Workbook)

Non-bulk and bulk packaging are differentiated by the maximum capacity or net mass of material each packaging could carry in either liquid, solid, or gas forms. Non-bulk packaging refers to a packaging generally with a volumetric capacity less than or equal to 450 L (119 gallons). Bulk packaging refers to a packaging generally with a volumetric capacity greater than450 L. Examples of non-bulk packagings are fiberboard boxes, drums, jerricans, bags, and cylinders. Examples of bulk packagings are intermediate bulk containers (IBCs), large packagings, and flexible bulk containers (FBCs). Column (8) provides Packing instructions and Column 9A special provisions for additional packaging requirements

9.1 Bulk Packaging

Fig. 18. Description of Bulk Packaging (Hazardous Materials Regulations 3.0 Packaging Student Workbook)

DRY BULK CARGO any cargo is considered bulk freight if it's not packaged, but transferred by weight or volume rather than in an individual unit – including sand, fly ash, aggregates and other dry materials. These trucks have large compartments designed to handle bulk quantities efficiently.

Fig. 19. Dry Bulk Cargo transportation

TANKERS TRUCKS is a specially designed-vehicle for transporting liquids or gases hazardous materials. They consist of a large cylindrical tank mounted on a truck chassis made from durable materials like steel or aluminum, ensuring the safe transportation of various commodities. The typical tanker holds 6,000-7,000 gallons, while some carriers

offer “tight fill” tanks that hold only up to 5,000 gallons. The tanker may consist of a single compartment or be divided into two-to-four compartments for hauling different commodities at once. They have pumps, hoses, and meters to facilitate loading and unloading operations and their design is crucial to prevent leaks, spills, and accidents during transport. They have cutting-edge safety features like compartments and baffles that help stabilize the load and reduce movement.

Fig. 20. Types of cargo tanker trucks (SafeRack https://www.saferack.com/)

Design number / name	*Transport material*
MC306/406	Flammable liquids and class b poisons - Non pressure liquids
MC307/407	Including the above, also low-pressure chemicals
MC312/412	Corrosive liquids
MC331	Compressed Gases (propane, LPG, chlorine)
MC338	Cryogenic gases (Liquid oxygen, hydrogen, nitrogen, and carbon dioxide)
MEGCs (multiple element gas containers)- High-pressure Tube Tank	Gases that can not be liquefied pressure applications (helium, nitrogen, oxygen, and argon gasses)

Table 13. The design numbers of tanker trucks and their transport material

Non low-pressure bulk liquid cargo tanks (MC306/406)

- Typically carries gasoline (UN/NA 1203), diesel fuel (fuel oil), liquid fuel products, alcohol, and almost any other kind of flammable or combustible liquids.

May contain mild corrosives, but not strong corrosives. Cannot contain pressurized gases.

- Oval in cross-section, with blunt ends.
- Newer tanks are aluminum and older can be steel. The tank is divided into two to five compartments (usually three to four); in some cases, different products may be in different compartments (in most states, mixed loads are not permitted).
- Oval or a shaped cross-section
- Flat or nearly flat ends
- Aluminum is the primary material
- Usually, multi-compartmented
- Separate manhole for each compartment
- There is a Fuel Transport Safety Emergency shutoff system on the driver's side front
- There is rollover protection to prevent manholes from opening up on rollover.
- Average maximum capacity 9,000 gallons however some tanks are built to hold less.
- Trailer pressure has a maximum of 3PSI

Low-pressure bulk liquid cargo tanks (MC307/407)

- Typically carries flammable or combustible liquids, acids, caustics, poisonous liquids.
- The maximum capacity is typically up to 6,000 gallons. Can be insulated or uninsulated:
- Uninsulated tanks are typically circular in cross-section. Typically, there are reinforcing rings around the tank. Tanks are aluminum or steel.
- Insulated tanks generally carry products that need to be kept either heated or cooled or products that need to be heated to be off-loaded. They are characteristically horseshoe-shaped when viewed from behind. They are comprised of an outer jacket, generally aluminum or steel, and an inner tank that may be lined (e.g., fiberglass).
- Container Pressure can be up to 40 psi @ 70°F
- Horseshoe-shaped cross-section.
- Stainless steel is the primary material of construction

- The tanker may be insulated. Insulation or the outer shell may hide the horseshoe tank shape.
- The fill port is usually at the center top of the tank.
- The dispensing ports are usually at the bottom of the tank.
- A multi-compartmented tank has a separate loading port for each compartment.
- There is a Fuel Transport Safety Emergency Shutoff control on the driver's side.
- Rollover protection to prevent manholes from opening up on rollover

Corrosives Cargo Tanks (MC312/412)

- Typically carries strong corrosives, such as sulfuric or nitric acid. Typically carries acids, also may carry bases. Sometimes may carry flammable liquids (e.g., grain alcohol), poison liquids, or oxidizing liquids. Cannot carry pressurized gases
- Circular in cross-section, with up to 10 reinforcing rings around the tank. May be very long. Often there is black, tar-like, corrosion protective coating around the manhole.
- Tank internal pressure is usually 35 to 50 psi. Because of pressurization, exterior strengthening rings are used for containment.
- The tank is usually lined with rubber or plastic.
- A cross-section of this type of tank appears round.
- These tanks are usually Stainless steel.
- Some of these tanks may have an insulated outer shell.
- The dispensing valves are usually at the rear of the tank at the bottom.
- If the tank has multiple compartments, each compartment will have a loading port.
- There is an emergency fuel transport safety shutoff mechanism.
- These tankers have a cigar shape and a long, small diameter.
- The average maximum capacity of these type of tanks range from 4,000 to 7,000 gallons

Compressed Gas Cargo Tanker (MC331)

- Circular appearance cross-section.
- This tank has rounded ends.
- This type of tank is constructed with a single shell that is made from carbon steel.
- Tanker valves, gauges, and piping are protected to limit damage from rollovers.

- In most cases, these tanks are painted white to prevent damage due to the sun's UV rays.
- Tank Pressure is rated at – 100 to 500 psi.
- Even more, the tanker contents are usually gases that are liquefied by the application of pressure.
- Tank Capacity in most cases ranges from 3,500 gallons for bobtail tanker to 11,500 gallons for highway transporters.

Cryogenic Cargo Tank (MC338)

- These tanks are designed to hold cryogenic liquids that hold a temperature of at least -130°F.
- Tanks have a cylindrical shape with a "box cabinet" on the rear of the tank.
- These tankers are designed like a Thermos bottle. There are 2 cylinders and one cylinder is inside the other cylinder.
- The area between the two cylinders is a vacuum which creates an airtight environment.
- Visible vapors escape from the vent on the rear cabinet area of the cylinder. However, his is normal.
- Internal tank pressures range from 23.5 to 500 psi with the lower end being the norm.
- Very high BLEVE potential (BLEVE – boiling liquid expanding vapor explosion, which occurs when the pressurized liquid inside of a vessel, such as a propane tank, reaches temperatures higher than that liquid's boiling point.)

MEGCs (multiple element gas containers) - High-pressure Tube Tank

- This tanker contains multiple tubes.
- Each tube is a separate container.
- Each tube is protected with a thermal plug. The thermal plug is designed to melt in a fire. This action relieves internal pressure and is a key element of fuel transport safety.
- In addition, Tubes are individually controlled in the rear compartment
- Off-loaded by "cascade style" (same method as used to fill SCBA bottles)
- Pressures of 4,000 to 6,000 psi per tube

- Usually, 9 to 12 tubes per trailer
- High-pressure tube rail cars are of the same design as these styles of highway cargo tanks

Intermodal Tank Container

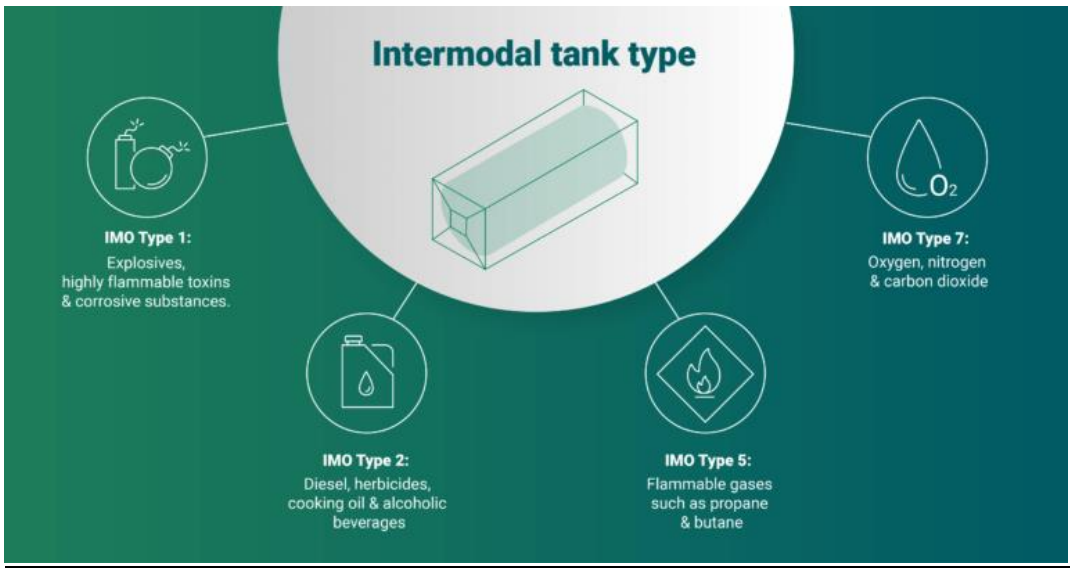


Fig. 21. Types of Intermodal tank container and their transport materials (Surupasree Sarmmah, xChange Author)

Fig. 22. Vehicles with Intermodal Tank Container

The International Maritime Dangerous Goods Code (IMO) classifies tank containers into IMO Type 1, IMO Type 2, and IMO Type 5. All three categories can transport hazardous products of varying “dangerous” levels. This helps in understanding which or what liquids or gases can be transported in a particular tank container.

Coding of tanks (for classes 3 - 9)

The four parts of the codes (tank codes) given in Column (12) of Table A in Chapter 3.2 have the following meanings:

Part	Description	Tank code
1	Types of tank	L = tank for substances in the liquid state (liquids or solids handed over for carriage in the molten state); S = tank for substances in the solid state (powdery or granular).
2	Calculation pressure	G = minimum calculation pressure according to the general requirements of 6.8.2.1.14 or 1.5, 2.65, 4, 10, 15 or 21=minimum calculation pressure in bar (see 6.8.2.1.14).
3	Openings (see 6.8.2.2.2)	A = tank with bottom-filling or bottom-discharge openings with 2 closures B = tank with bottom-filling or bottom-discharge openings with 3 closures C = tank with top-filling and discharge openings with only cleaning openings below the surface of the liquid D = tank with top-filling and discharge openings with no openings below the surface of the liquid
4	Safety valves/devices	V = tank with a breather device, according to 6.8.2.2.6, but no device protecting against the propagation of a flame or non-explosion pressure shock resistant tank F = tank with a breather device, according to 6.8.2.2.6, fitted with a device protecting against the propagation of a flame or explosion pressure shock resistant tank

Table 14. Coding of tanks for classes 3 – 9 and its meaning

Intermediate Bulk Containers (IBCS)

An intermediate bulk container (or IBC) is a pallet mounted, industrial grade reusable container that is used for storing and transporting bulk liquids and powders. Also known as a tote, the IBC is capable of stacking and can be moved by a pallet jack or forklift. The types of IBCs in use today can be categorized under rigid and flexible. The term ‘intermediate’ comes from the volume that intermediate bulk containers carry, which sits in between that of tanks and drums. IBCs come in a variety of sizes ranging from 416 to 2081 litres.

Fig. 23. Stacking of Intermediate Bulk Containers (IBCS)

Fig. 24. Mark and label checking of Intermediate Bulk Containers

Rigid IBCS

These are cubical in shape, the inner containers are made up of HDPE or metals like aluminum, galvanized iron, Carbon or Stainless Steel

-HDPE – HDPE plastic IBC containers are equipped with a steel cage and a composite pallet made of steel and plastic. These are the most traditional, standard IBC containers. The steel cage adds extra stability to the plastic bottle and allows these to be stacked for economical storage.

-Carbon Steel or Stainless Steel – Corrosion resistant and equipped to be reusable, these stainless-steel IBC totes, are ideal for things like oils, solvents, lubricants, chemicals, coatings, dyes, and sanitation chemicals. That's why they are the most sought-after tank for the chemical, pharmaceutical, and petrochemical industries. Carbon steel and stainless-steel IBC tanks are low maintenance with limitless service life due to all-welded, thick 10-gauge steel tanks.

These IBCs have a tap or valve at the base where a hose can be attached to allow transfer of contents into small containers for easy packaging, distribution and sale in the target location. These are designed to maintain their shape during storage and transport. These are cost-effective and can be easily carried from one point to another. They can carry

most hazardous and precious chemicals across long stretches of land and water without leakage. These IBCs can be easily reinforced which prevents fumes from escaping. IBC tank limits commonly have a volume capacity of 1,040 and 1,250 liters

Flexible IBCs

They are also called bulk bags that are made up materials such as polypropylene or polyethylene (woven polyethylene bags), plastics or paper. Usually designed to ship and store dry solids without any need for further packing. FIBCs ordinarily hold somewhere in the range of 500 to 2000 kg weight of the goods in them and have the volume capacity of 285–2,830 liters.

Fig. 25. Bulk bags belong to the category of flexible IBCs

9.2 Non-bulk packaging

The ADR specifies the correct way to package dangerous goods, be it in a box, drum, IBC, large packaging or other system(s) of containment. Packaging provides a safeguard for people and the environment during loading, transport and unloading of dangerous goods and must therefore be appropriate for the dangerous goods concerned. For packaging of dangerous goods, you can only packaging which:

- in terms of quality and performance, correspond to the quantity and characteristics of the dangerous goods for which they are used (dangerous goods must not damage or react with the packaging),
- it admissible the transport of dangerous goods (in accordance with the packaging instructions according to the ADR),
- is tested and approved in accordance with the ADR (has the relevant ADR packaging code),
- has, in accordance with the ADR, inscriptions and labels or labels to indicate the danger and other information on dangerous goods and packaging (has a UN number and ADR labels)

SINGLE PACKAGING is packaging that can conform its containment function as a single package. It consists of one single container, for example, a drum.

COMPOSITE PACKAGING means a packaging consisting of an outer packaging and an inner receptacle, so constructed that the inner receptacle and the outer packaging form an integral packaging.
Once assembled, it remains an integrated single unit. It is filled, stored, shipped, and emptied as such. An example includes a drum with a liner integrated into its design.

COMBINATION PACKAGING means a combination of packaging, for transport purposes, consisting of one or more inner packagings secured in a non-bulk outer packaging. It does not include a composite packaging. Examples include a fiberboard box designed to contain inner plastic packagings of material.

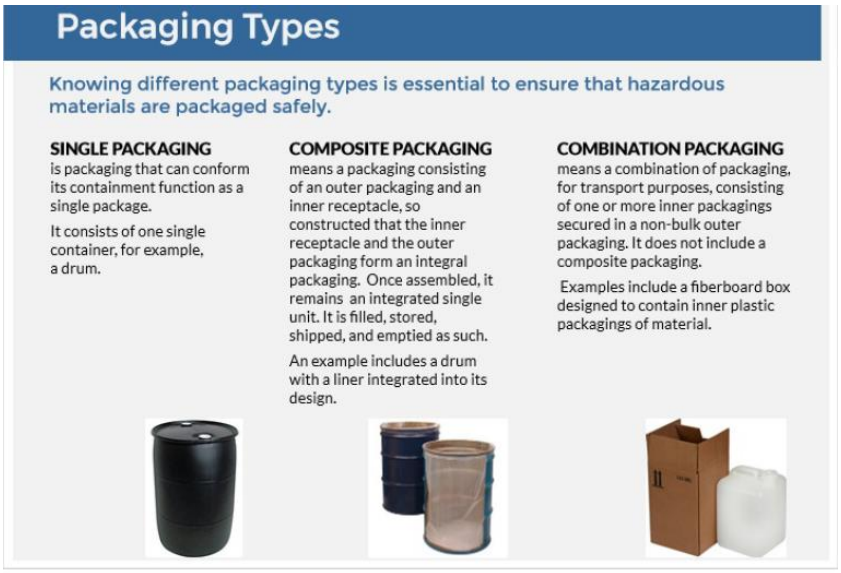


Fig. 26. Packaging types of non-bulk packaging (Hazardous Materials Regulations 3.0 Packaging Student Workbook)

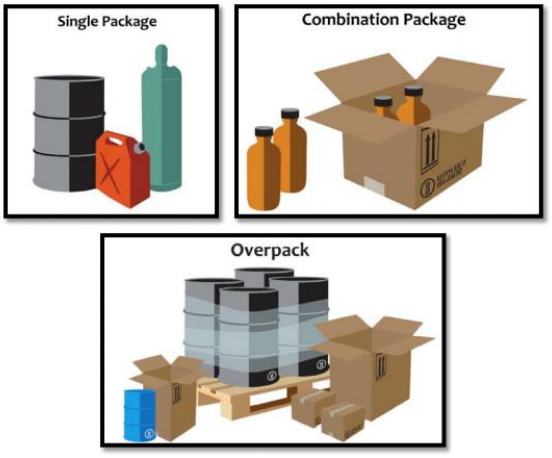


Fig. 27. Examples of packaging types of non-bulk packaging

OVERPACKS

Another commonly used packaging term is an overpack, means an enclosure that is used by a single consignor to provide protection or convenience in handling of a package or to consolidate two or more packages. Overpacks usually take the shape of several crates or boxes that have been secured to a pallet and shrink-wrapped/strapped, but they can also be single receptacles, such as a gas canister, placed into another protective outer box or other packaging. for road overpacks must show the hazard labels (warning diamonds – primary and subsidiary, if they are required) for each dangerous goods package contained in the overpack and any additional handling markings appearing on the packages.

Overpacks must also be marked with the word ‘OVERPACK’ in the official language of the country of origin. The overpack text must be at least 12mm high and is usually in red

or black. The UN number of each substance inside the overpack must be shown, and this must be preceded by the capital letters 'UN'.

If the inner packages contain the Environmentally Hazardous Substance (EHS) mark, then this must also be shown on the overpack.

The overpack must also display orientation arrows, on two opposite sides, if the inner packages display them but they are not visible through the outer packaging. If the packages contain liquids, then orientation arrows are always advised on the overpack.

10. Marking & Labelling of hazard goods

10.1 Marking hazard goods

Markings**:** the most significant mark in the ADR is the UN number of the substance or article and other marks include the environmentally hazardous substance mark, lithium battery mark and orientation arrows. Marks are designed to meet certain specifications. The dimensions of a mark depend on the use and application.

"UN approved" this means the package has been tested and approved according to ADR. A manufacturer must mark every packaging that meets a UN standard with the following information presented in a single line or in multiple lines in the following sequence:

- Identification Codes for designating kinds of packagings (e.g., 4G or 1A1) The first kind is the so-called UN 4G, which is a fibreboard box that can be used only in combination with the inner packaging(s) it was certified with. If you buy the inner or outer packaging from a different supplier than the one who made the certified prototypes, will void the certification. The second kind is the so-called UN-certified 4GV that, unlike 4G, can be used in combination with different inner receptacles. 4GVs can be used to transfer different product groups, such as corrosives, gases, or flammable liquid substances.
- A letter identifying the packing group under which the packaging design type has been successfully tested (X, Y, or Z). "X" means a packaging has been rated

to perform to the GREAT DEGREE of danger presented by the material, or packing group one, but may also be used for packing groups II and III.

- "Y" means a packaging has been rated to perform to the MEDIUM DEGREE of danger presented by the material, or packing group II, but may also be used for packing group III. "Z" means a packaging has been rated to perform to the minor degree of danger presented by the material, or packing group III, and may not be used for any other packing groups.
- A designation of the specific gravity or mass for which the packaging design type has been tested: For single packages containing liquids, you'll find the specific gravity of a material (for example, Y1.5). For packaging intended for solids or for combination packages, you will find the max gross mass in kilograms (for example, X13).
- Hydraulic Pressure in Kilo-Pascal: for single and composite packagings intended to contain liquids or the letter "S" for packagings intended to contain solids or inner packagings
- The last two digits of the year of manufacture
- Country where package was manufactured and marked
- Code for UN Certifying Agency or Manufacturer
- The thickness of the packaging material in mm for metal or plastic drums or jerricans intended for reuse or reconditioning as single packagings or the outer packagings of a composite packaging.

10.1.1 Identification codes for Packages

The table 15 indicates the codes to be used for designating types of packagings depending on the kind of packagings, their construction material and their category.

Packaging Type	MATERIAL	CATEGORY
1- Drum	A- Steel	**A, B, H Drums, Jerricans**
2- Wooden Barrel	B- Aluminum	1- Removable Head
3- Jerrican	C- Natural Wood	2- Non-removable Head
4- Box	D- Plywood	**A or B Boxes**
5- Bag	F- Reconstituted Wood	1- Ordinary A or B
6- Composite packaging	G- Fiberboard	2- A or B with liner or coatings
7- Pressure receptacles	H- Plastic	**C Boxes**
	L- Textile	1- Ordinary
	M- Paper, multi-wall	2- With sift proof wall
	N- Metal, other than Steel or Aluminum	**H Boxes**
	P- Glass, Porcelain, or Stoneware	1- Expanded plastic
		2- Solid Plastic
		L Bags
		1-Unlined or non-coated
		2- Sift-proof
		3- Water resistant
		M Bags
		1- Multiwall
		2- Multiwall, water resistant

Table 15. Identification codes for Packages

In the case of composite packagings, two capital letters are used in sequence in the second position of the code. The first indicates the material of the inner receptacle and the second that of the outer packaging. In the case of combination packagings only the code number for the outer packaging is used

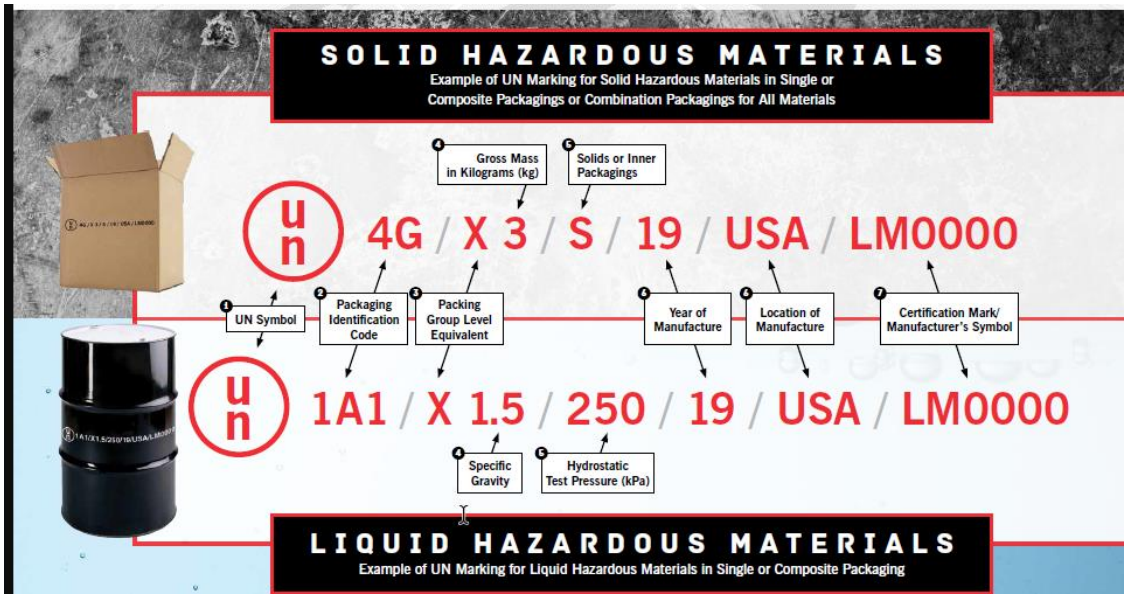


Fig. 28. Example of UN Marking for hazard materials in packaging (https://www.labelmaster.com)

10.1.2 Identification codes for IBC

Type	For solids, filled or discharged		For liquids
	by gravity	under pressure of more than 10 kPa (0.1 bar)	
Rigid	11	21	31
Flexible	13	-	-

Materials

A. Steel (all types and surface treatments)
B. Aluminium
C. Natural wood
D. Plywood
F. Reconstituted wood
G. Fibreboard
H. Plastics material
L. Textile
M. Paper, multiwall
N. Metal (other than steel or aluminium).

Table 16. Identification codes for IBC

For composite IBCs, two capital letters shall be used in sequence in the second position of the code. The first shall indicate the material of the inner receptacle of the IBC and the second that of the outer packaging of the IBC.

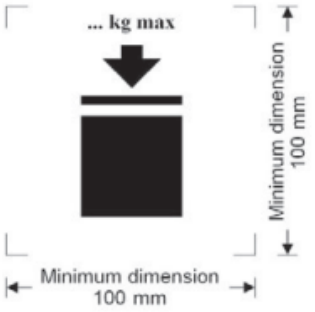
Fig. 29. Example of UN marking for IBC (PHMSA, Performance Packaging Codes.pdf)

Additional marks	Category of IBC				
	Metal	Rigid plastics	Composite	Fibreboard	Wooden
Capacity in litres [a] at 20 °C	X	X	X		
Tare mass in kg [a]	X	X	X	X	X
Test (gauge) pressure, in kPa or bar [a], if applicable		X	X		
Maximum filling / discharge pressure in kPa or bar [a], if applicable	X	X	X		
Body material and its minimum thickness in mm	X				
Date of last leakproofness test, if applicable (month and year)	X	X	X		
Date of last inspection (month and year)	X	X	X		
Serial number of the manufacturer	X				

[a] *The unit used shall be indicated.*

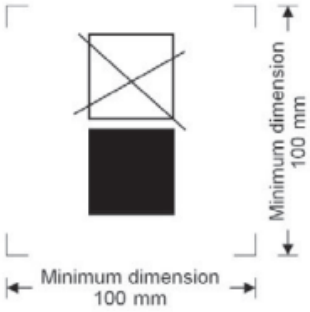
The maximum permitted stacking load applicable shall be displayed on a symbol as shown in Figure 6.5.2.2.2.1 or Figure 6.5.2.2.2.2. The symbol shall be durable and clearly visible.

Figure 6.5.2.2.2.1



IBCs capable of being stacked

Figure 6.5.2.2.2.2



IBCs NOT capable of being stacked

The minimum dimensions shall be 100 mm × 100 mm. The letters and numbers indicating the mass shall be at least 12 mm high. The area within the printer's marks indicated by the dimensional arrows shall be square. Where dimensions are not specified, all features shall be in approximate proportion to those shown. The mass marked above the symbol shall not exceed the load imposed during the design type test (see 6.5.6.6.4) divided by 1.8.

In addition to the marks required in 6.5.2.1, flexible IBCs may bear a pictogram indicating recommended lifting methods.

Fig. 30. Informations about additional marks and stacking load of IBC (ADR 2023, Volume II annex A, paragraph 6.5.2.2)

Examples of additional package marking

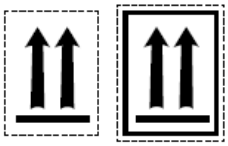
Marks	Remarks
	Environmentally hazardous substance (EHS) mark Not required for packaging consisting of containers of less than 5 kg/5 L
	Orientation arrows for: • Combination packaging having inner packaging containing liquids • Single packaging fitted with vents • Cryogenic receptacles intended for the carriage of refrigerated liquefied gases Apply on two opposite sides
	Elevated temperature substances mark Applied to tanks, tank-containers etc. Mark is not for packages
	Limited quantities mark (except for air transport)
	Limited quantities mark for air transport (accepted in all modes of transport)
	Excepted quantities mark
 	Vehicle and container coolant warning mark Lithium battery mark

Fig. 31. Additional package marking and its meaning (HSA | Carriage of Dangerous Goods by Road 2021

10.2 Labelling hazard goods

Labels are diamond-shaped labels applied to the outside surface of dangerous goods packages provides an instant visual warning to everyone, not least those handling the goods and emergency services from afar, using only symbols, numbers and colors. According to ADR they must

- Be legible – visible and not hidden by other packaging.
- Be next to the marking (UN Number).
- If additional risk labels are placed, they should be next to each other
- on the other.
- Have a size of at least 100x100mm.

- There should be a color contrast with the color of the packaging.
- be weather resistant

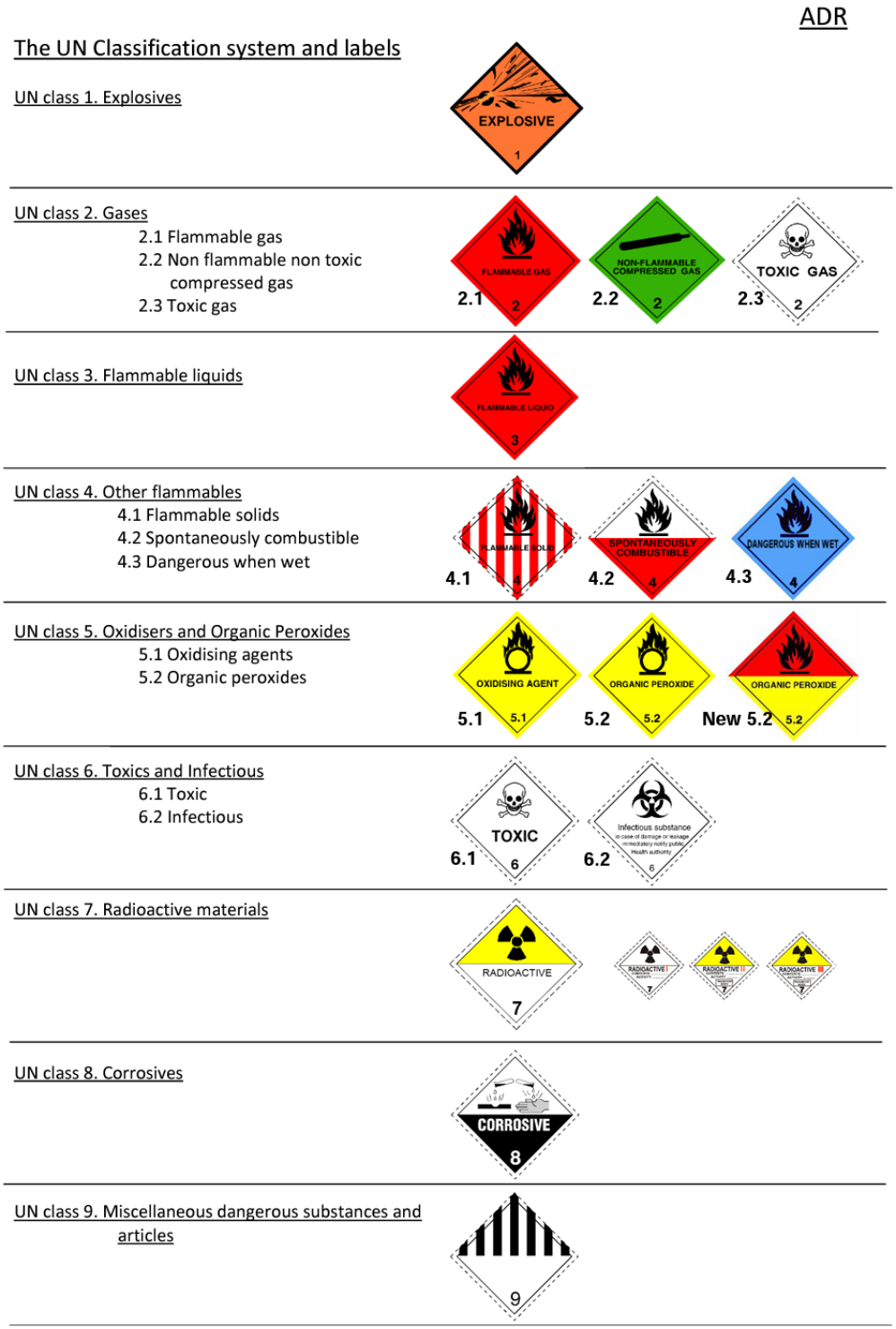


Fig.32. The UN classification system and labels (SafeRack)

11. Marking and Labelling of vehicles and tanks

All vehicles transporting hazardous materials must carry special markings for easy identification of the transported hazardous material and the type of danger that may be caused by this material so that the loads can be properly managed.

The ADR Agreement provides for all vehicles transporting dangerous goods (with the exception of vehicles transporting radioactive materials, to which they apply special provisions) two types of markings:

11.1 The Orange cargo identification plates

Transport units carrying dangerous goods shall display two rectangular orange-colored plates, set in a vertical plane. They shall be affixed one at the front and the other at the rear of the transport unit, both perpendicular to the longitudinal axis of the transport unit. They shall be clearly visible, with dimensions of 400x300mm, with a black border of 15mm thickness, on the front and the back of the vehicle. Depending on the characteristics of the vehicle, it is possible to reduce the dimension of the sign to 200x120mm, with a black margin of 10mm.

Tank vehicles or transport units with one or more tanks that carry more than one ADR dangerous substance must additionally carry on the side walls of each tank or compartment, visible and parallel to the longitudinal axis of the vehicle, orange plates with the hazard identification numbers for each transported material.

For containers - tanks, the signs can be replaced by stickers or painted on the sides or in any other equivalent way, as long as the materials used for this purpose are resistant to weather conditions and of guaranteed duration.

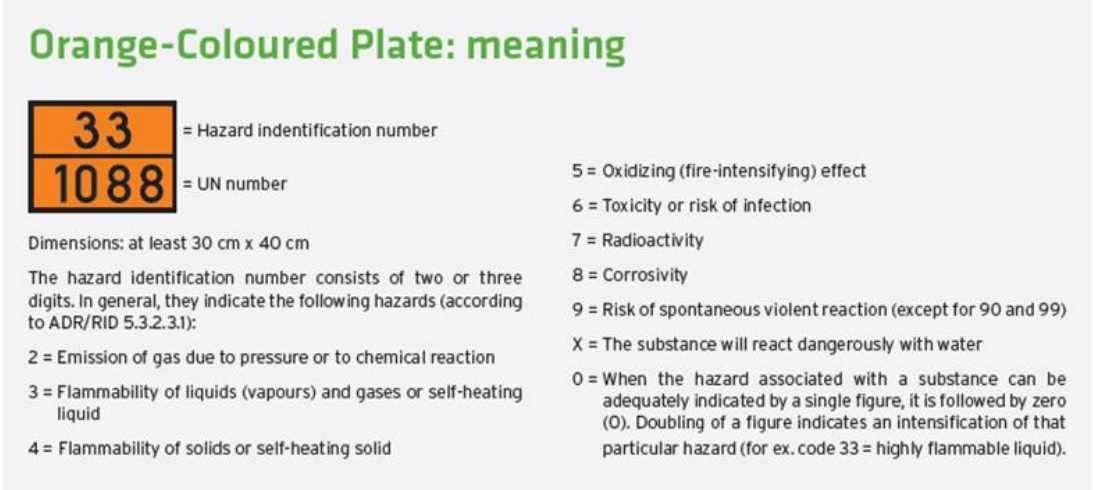


Fig.33. The meaning of Orange Coloured Plate on ADR vehicles

For hazard identification numbers:

The hazard identification number is made up of two or three numbers that indicate the following hazards.

2 Emission of gas due to pressure or to chemical reaction

3 Flammability of Liquids

4 Flammability of solid or self-heating liquid

5 Oxidising (fire-intensifying) effect

6 Toxic or risk of infection

7 Radioactivity

8 Corrosivity

9 Risk of spontaneous violent reaction

When the figure is doubled it indicates intensification of a particular hazard. When X precedes the Hazard Identification number this indicates the substance will react dangerously with water. In this instance water may be used only with the approval of experts. Where the hazard associated with a substance can be adequately indicated by a single figure, this is followed by a zero.

The following combinations have special meanings – refer to Hazchem List or control:

22 Refrigerated liquefied gas, asphyxiant

323 Flammable liquid which reacts with water, emitting flammable gases

333 Pyrophoric liquid

362 Flammable liquid, toxic, which reacts with water, emitting flammable gases

382 Flammable liquid, corrosive, which reacts with water, emitting flammable gases

423 Solid, flammable solid or self-heating solid which reacts with water, emitting flammable gases

432 Spontaneously flammable (pyrophoric) solid which reacts with water, emitting flammable gases

44 Flammable solid, in the molten state at an elevated temperature

446 Flammable solid, toxic, in the molten state at an elevated temperature

462 Toxic solid which reacts with water, emitting flammable gases

482 Corrosive solid which reacts with water, emitting flammable gases

539 Flammable organic peroxide

606 Infectious substance

623 Toxic liquid which reacts with water, emitting flammable gases

642 Toxic solid, which reacts with water, emitting flammable gases

823 Corrosive liquid which reacts with water, emitting flammable gases

842 Corrosive solid which reacts with water, emitting flammable gases

90 Environmentally hazardous substance; miscellaneous dangerous substance

99 Miscellaneous dangerous substance carried at an elevated temperature

11.2 Hazard placards labels

These placed on transport vehicles, communicate with the hazards of chemicals inside, so warn the people of the presence of hazards being transported. They have diamond shaped, 250 x 250mm in size, and need to be displayed on all four sides of vehicle They must always be displayed in the square-on-point configuration and be located at least 3 inches away from any other marking that may reduce its effectiveness.

Fig.34. Hazard Placards colours meaning (SafeRack)

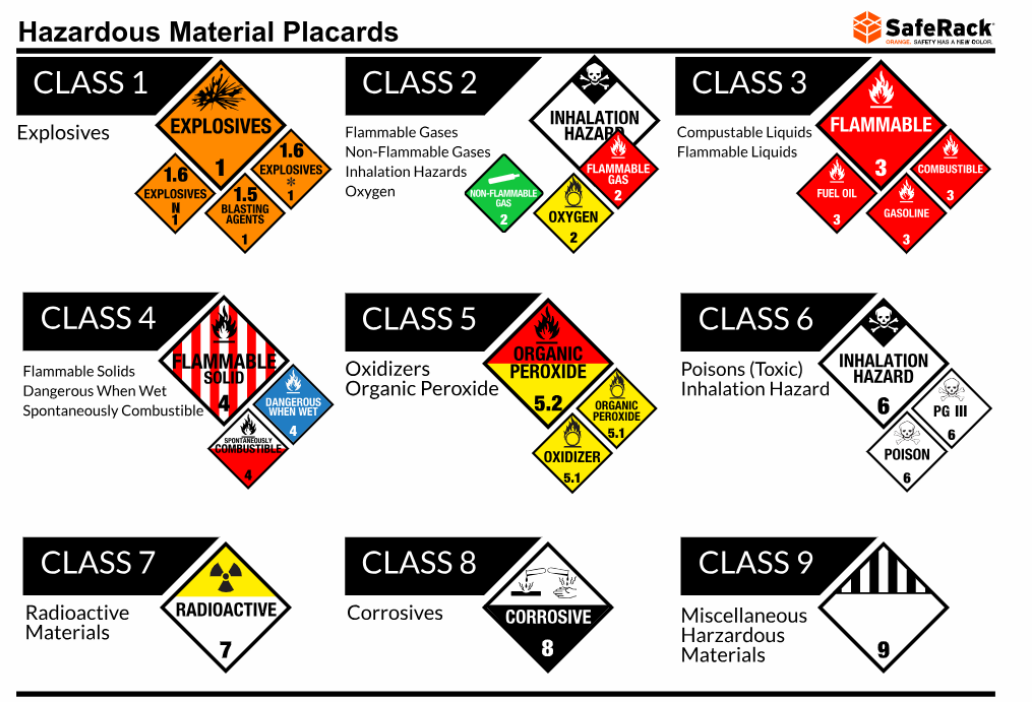


Fig.35. Hazard materials warning placards (SafeRack)

It is the responsibility of carriers to ensure the correct vehicle is used and that appropriate marking is applied. Drivers may also share in the marking duties (e.g. their responsibilities include the removal/covering of ADR "orange plates" when all dangerous goods are unloaded). When vehicles are transporting dangerous goods, they are marked with ADR orange plates (front and rear). When vehicles are carrying containers, the freight container must also be labelled or "placarded" with the appropriate class label on all four sides

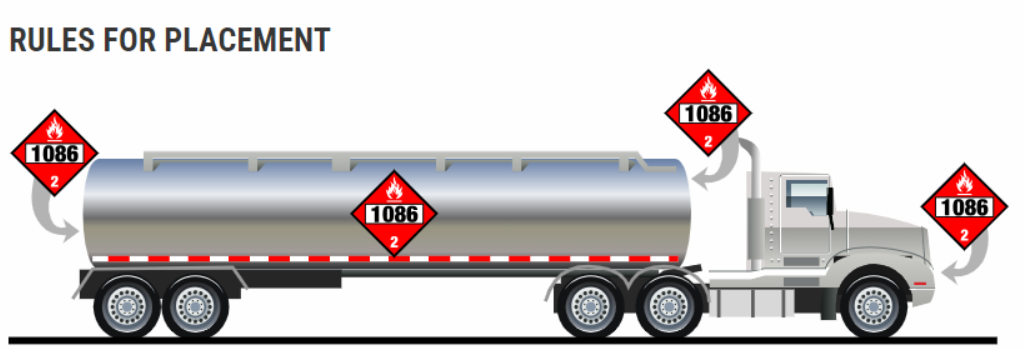


Fig.36. Example of hazardous placards placement on ADR vehicle (SafeRack)

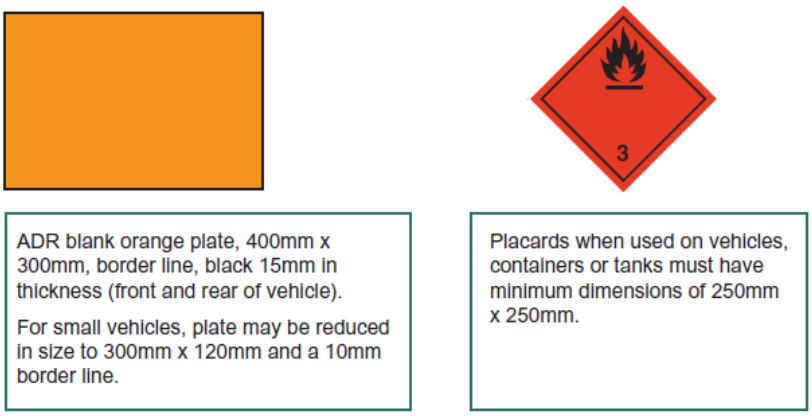


Fig.37. The minimum dimensions of the orange plates and the hazard warning placards (HAS, Carriage of Dangerous Goods by Road, A Guide for Business)

When carrying goods in bulk (unpackaged loose material) the vehicle must also be labelled or "placarded" with the appropriate class label on both sides and rear. Bulk vehicles must also identify the goods by using the numbered orange plates on both sides of the bulk container in addition to blank orange plates at the front and rear. For the carriage of dangerous goods in tanks, ADR requires marking of both the vehicle and tank (e.g. numbered orange plates at the front and rear of the vehicle, hazard placards and other marks as required on each side of the tank and at the rear). Alternative marking methods are specified in ADR. Blank orange plates may be used at the front and rear of the vehicle with numbered orange plates on each side of the tank. Figure 38 provides an example of such side tank marking with numbered orange plate, class hazard placard and an elevated temperature mark (red triangle with thermometer).

Fig.38. Example of side tank marking with numbered orange plate, class hazard placard and an elevated temperature mark (HAS, Carriage of Dangerous Goods by Road, A Guide for Business)

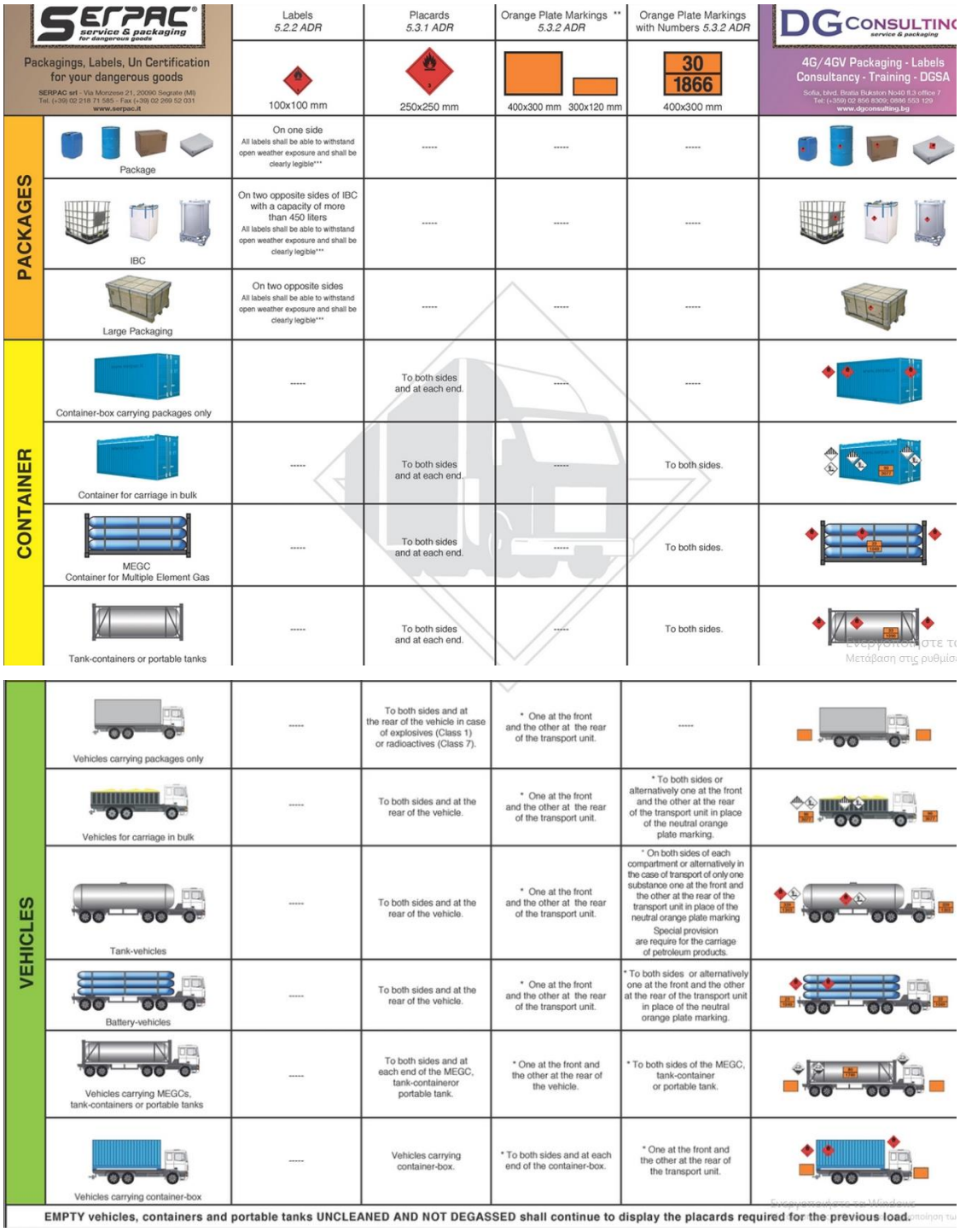


Fig.39. Review of the right placement of all marks and labels to packages, containers and vehicles (DG Consulting, Catalog 2017)

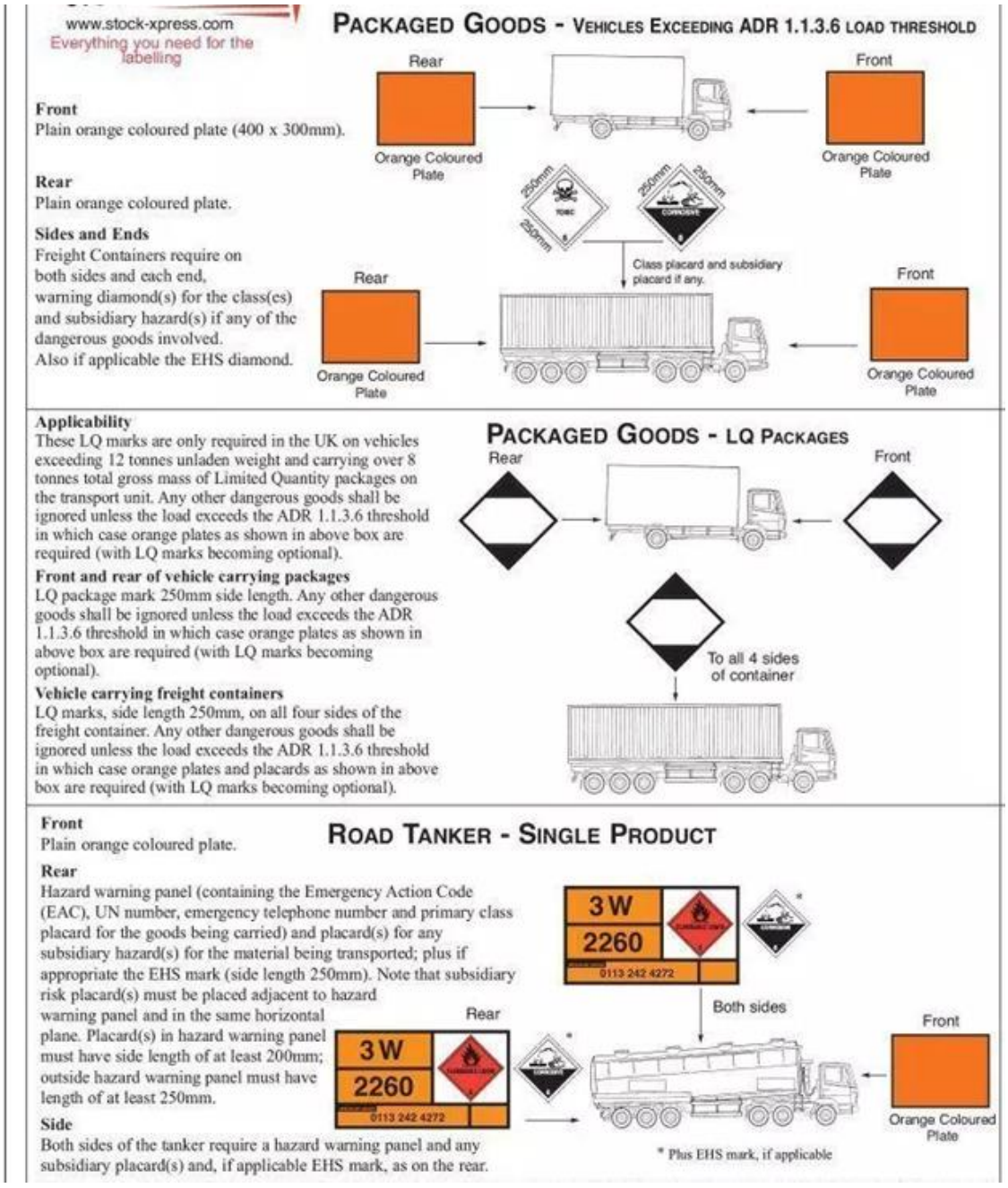


Fig.40. Detailed guide at marking and labeling for ADR vehicles carrying packaged goods and road tanker (SafeRack)

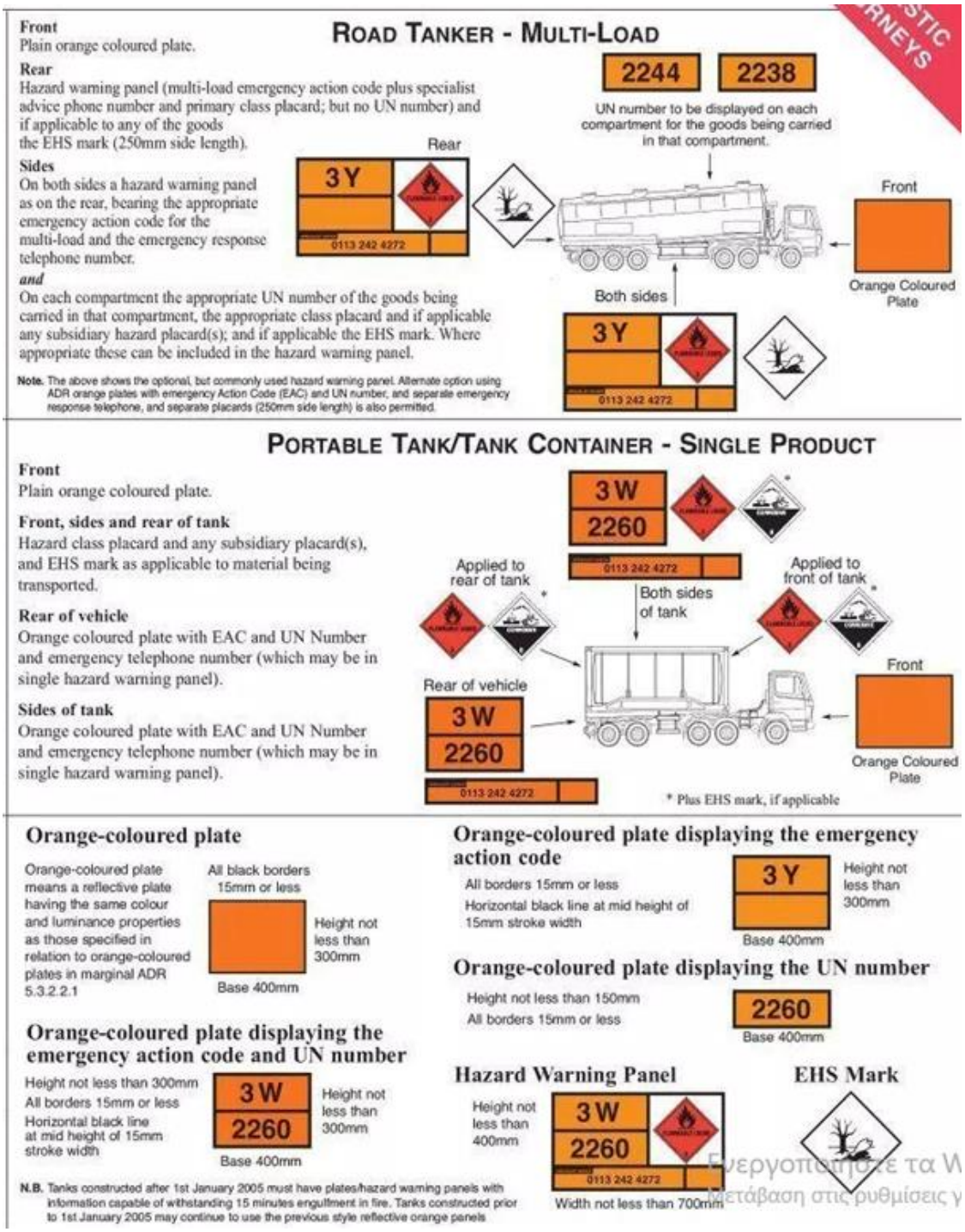


Fig.41. Detailed guide at marking and labeling for road and portable tanker (SafeRack)

12. Equipment to be carried on a vehicle

12.1 Mandatory personal protective equipment

For each vehicle:

- A suitable wheel chock for the size of vehicle
- Two self-standing warning signs
- Eye wash (2 x 500 ml). This is not required for goods with danger label numbers 1, 1.4, 1.5, 1.6, 2.1, 2.2 and 2.3.

For each member of the vehicle crew:

- A warning vest
- Torch (for the carriage of flammable substances, an ATEX compliant torch is required)
- Protective gloves
- Safety glasses.

Additional equipment for certain classes:

- An emergency escape mask for each crew member in vehicles carrying goods with danger label numbers 2.3 or 6.1;
- A shovel, drain seal and plastic collecting container in vehicles carrying goods with danger label numbers 3, 4.1, 4.3, 8 and 9.

Requirements depend on the type of dangerous goods being transported. Table 17 shows the safety equipment required for transporting each class or division of dangerous goods (X = required item).

Class/ Division	Escape breathing apparatus	Gastight goggles/ face shield	Eyewash kit (d)	Chem-resistant gloves	Thermal gloves	Chem-resistant coveralls	Chem-resistant boots	Torch	Flame-proof torch
2.1 (a)		X (c)			X				X
2.2		X (c)			X			X	
2.3	X (b)	X	X		X			X	
3 / 4			X	X					X
5.1 Solids			X	X				X	
5.1 Liquids		X	X	X		X	X	X	

5.2		X	X	X		X	X		X
6.1 and 8	X (b)	X	X	X		X	X	X	
6.2				X				X	
9			X	X	X (e)			X	

a) - gas detector required for unodourised LPG

(b) - short-term air supplied breathing apparatus equipment is required, unless there is no possibility of harmful vapours, gases or dusts even in an emergency

(c) - if the receptacle carries more than 500 litres or contains cryogenic liquid

(d) - an eyewash kit must be of at least 250ml capacity, filled and ready for use

(e) - if elevated temperature substance or dry ice

Table 17. The safety equipment required for transporting each class or division of dangerous goods

12.2 Fire-fighting equipment

The ADR specifies fire extinguisher requirements for transport units carrying dangerous goods. Table 8 outlines the specific fire extinguisher requirements for various transport units. Over the last twenty years there have been significant changes to the fire extinguisher requirements of the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) for vehicles carrying dangerous goods, this article reviews the current requirements and problems encountered with fire extinguishers, as well as other related matters.

Until the 2001 edition of ADR, the basic provisions for the number of fire extinguishers to be fitted were one 2kg dry powder or equivalent fire extinguisher for fighting a fire in the cab or engine compartment and an additional one 6kg fire extinguisher. This could be reduced to a further one 2kg extinguisher for vehicles with a maximum permitted gross mass of 3.5 tonnes or less. There were some further exemptions in those days which continue to this day for small loads corresponding to 1.1.3.6 of the ADR and for infectious substances of Class 6.2. That situation changed in the 2003 edition of the ADR to what we have today, that there are break points for vehicles with a maximum permissible mass of up to 3.5 tonnes, between 3.5 tonnes and 7.5 tonnes and over 7.5 tonnes.

Scenario	Requirement
All transport units	Minimum of a 2 kg dry powder (or equivalent) extinguisher suitable for fighting a cab or engine fire
Units with a maximum permissible mass of more than 7.5 tonnes	One or more portable fire extinguishers with minimum total capacity of 12 kg dry powder (or equivalent). At least one extinguisher should have a minimum capacity of 6 kg.
Units with a maximum permissible mass of more than 3.5 tonnes up to and including 7.5 tonnes	One or more portable fire extinguishers with minimum total capacity of 8 kg dry powder (or equivalent). At least one extinguisher should have a minimum capacity of 6 kg.
Units with a maximum permissible mass of up to and including 3.5 tonnes	One or more portable fire extinguishers with minimum total capacity of 4 kg dry powder (or equivalent)
Transport units exempted under the small load exemption (ADR 1.1.3.6)	Minimum of a 2 kg dry powder (or equivalent) extinguisher suitable for fighting a cab or engine fire

Table 18. Fire extinguisher requirements for transport units according to ADR

Extinguishers must be maintained and inspected annually. They must be stowed securely in or on the vehicle and be easily accessible, that is, not locked in storage compartments in the vehicle.

Placement of fire extinguishers: each fire extinguisher must be mounted securely in a quick-release bracket. Where only one extinguisher is required for the load area, locate it on the discharge side of a tank vehicle. For other vehicles, locate it near the driver's door or at the front of the trailer with a placard load. Where two or more extinguishers are required for the load area, mount one on the near side towards the rear and one on the offside near the front.

12.3 Documentation

Every transport of dangerous goods must be documented in writing, that’s why there are the transport documents.

Completing the transport documents is the responsibility of the sender and is intended to inform the driver about the transport he is about to carry out.

The main details that must be listed in a transport document are given below

- The UN Number.
- The correct shipping cargo name.
- The Class.
- The additional hazard label number in parentheses if an additional hazard exists.
- The Packaging Group (PG).
- The number of packages being transported and a brief description of them.
- The total quantity of transported materials for each different material (for each different UN Number).
- The name and address of the sender.
- The name and address of the recipient.
- For the exception of "small quantities" it is written on the transport document: "The cargo does not exceed the exemption limits described in 1.1.3.6".
- Statement as required by the terms of any special agreement. The tunnel code is entered, where required, which prohibits the vehicle from passing through.

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MULTIMODAL DANGEROUS GOODS FORM

1. Shipper / Consignor /Sender		2. Transport document number	
		3. Page 1 of Pages	4. Shipper's reference
			5. Freight Forwarder's reference
6. Consignee		7. Carrier (to be completed by the carrier)	
		SHIPPER'S DECLARATION I hereby declare that the contents of this consignment are fully and accurately described below by the proper shipping name, and are classified, packaged, marked and labeled /placarded and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.	
8. This shipment is within the limitations prescribed for: (Delete non-applicable) PASSENGER AND CARGO AIRCRAFT / CARGO AIRCRAFT ONLY		9. Additional handling information	
10. Vessel / flight no. and date	11. Port / place of loading		
12. Port / place of discharge	13. Destination		

14. Shipping marks	* Number and kind of packages; description of goods	Gross mass (kg)	Net mass	Cube (m^3)

15. Container identification No./ vehicle registration No.	16. Seal number (s)	17. Container/vehicle size & type	18. Tare (kg)	19. Total gross mass (including tare) (kg)

CONTAINER/VEHICLE PACKING CERTIFICATE I hereby declare that the goods described above have been packed/loaded into the container/vehicle identified above in accordance with the applicable provisions ** **MUST BE COMPLETED AND SIGNED FOR ALL CONTAINER/VEHICLE LOADS BY PERSON RESPONSIBLE FOR PACKING/LOADING**	21.RECEIVING ORGANISATION RECEIPT Received the above number of packages/containers/trailers in apparent good order and condition unless stated hereon: RECEIVING ORGANISATION REMARKS:	
20. Name of company	Haulier's name	22. Name of company (OF SHIPPER PREPARING THIS NOTE)
Name / Status of declarant	Vehicle reg. no.	Name / Status of declarant
Place and date	Signature and date	Place and date
Signature of declarant	DRIVER'S SIGNATURE	Signature of declarant

Fig. 42. Multimodal dangerous goods form at transport documents

Other transportation documents

- Instructions in writing according to ADR: contains informations in case of an accident emergency situation that may occur or arise during carriage. Instructions in writing in the form specified in 5.4.3.4 of ADR must be carried in the crew's cab and readily available and the crew has to consult this information before departure. These shall be provided by the carrier to the vehicle crew in language(s) and ensure that each member of the vehicle crew concerned understands and is capable of carrying out the instructions properly.
  https://www.unece.org/fileadmin/DAM/trans/danger/publi/adr/Instructions/English_2017.pdf

- ADR vehicle type approval certificate: It concerns certain vehicles transporting dangerous goods. These vehicles must meet certain specific technical specifications of the ADR Agreement. These are the vehicles mentioned as FL, AT, OX, EX/II and EX/III.

- ADR vehicle inspection certificate: issued after the annual inspection by the vehicle technical inspection centers (kteo)

- ADR driver certification: The date of validity of the ADR certificate shall not have expired and type of Dangerous Goods the driver is allowed to transport is listed.

- Copy of Approval from Competent Authority: It is about special transports of dangerous goods that, in order to be carried out, require special approval from the Competent Authority (mainly found in radioactive, explosives, blood transport, plasma transport, biological material transport and waste transport).

- Additional documents and instructions: These are additional documents and instructions that the sender delivers to the driver. In the case of combined (multimodal) transport (road-rail-sea) the existence of additional documents required by the respective codes for the transport of dangerous goods (RID Regulation, IMDG Code) is required.

13. General transport provisions

13.1 Loading

When placing different types of goods on a vehicle, the main difficulties arise from the different weights, dimensions and shape of the goods. Differences in the strength of the packages but also in properties of goods can, when combined, pose risks. Even more care must be taken when transporting dangerous goods when a dangerous good is combined with another. The possible combinations of goods are extremely numerous, so it is not possible to present them in full, however, some general guidelines are given in bellow.

The law sets out Performance Standards for load restraint which are the minimum amount of force a restraint system must be able to withstand in each direction. For heavy vehicles, these forces are shown below:

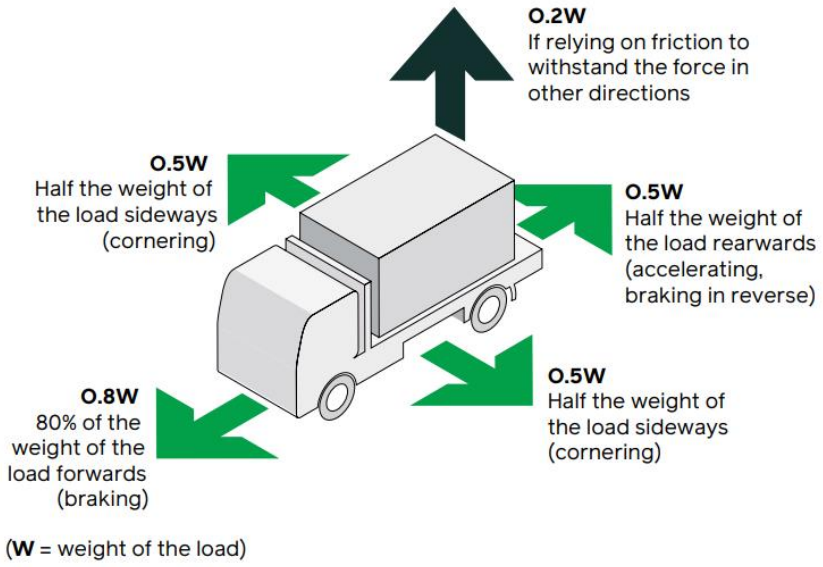


Fig. 43. Graphic representation of the load restraint performance standard (Load Restraint Guide 2nd edition)

13.1.1 Weight distribution

The cargo area of the vehicle must be suitable to receive the load. Under no circumstances should the permitted gross weight of the vehicles and the permitted axle loads be exceeded. Any partial unloadings and the remaining load must be taken into account when loading. The voids that arise between the objects, due to the different shapes and sizes, must generally be filled to provide greater stability and satisfactory load support. When loading, the center of gravity of the total load must be kept as low as possible. Also, the center of gravity of the total load must be as close as possible to the center of gravity of

the vehicle. The purpose of the correct distribution of the load is to achieve the maximum strong stability during the movement of the vehicle. For this reason, heavier items should be placed lower in height and as close as possible to the middle of the loading platform or cargo area floor. For the correct distribution of the load, the loading of the vehicle's axles must be taken into account. By using rectangular closed strong packages of various sizes, one can easily achieve a satisfactory immobilization of the other load on the front, rear or side walls of the cargo area.

Transport units are particularly sensitive to the position of the center of gravity of the load, due to specified axle loads for maintaining steering and braking ability. Such vehicles may be equipped with specific diagrams, which show the permissible pay load as a function of the longitudinal position of its center of gravity. Generally, the maximum pay load may be used only when the center of gravity is positioned within narrow boundaries about half the length of the loading space.

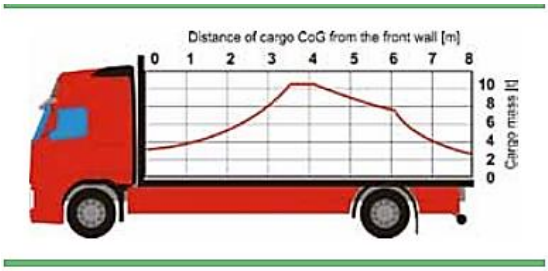


Fig. 2. Example of load distribution diagram – motor vehicle two axles

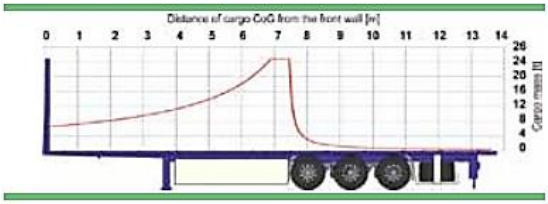


Fig.3. Example of load distribution diagram - semi-trailer

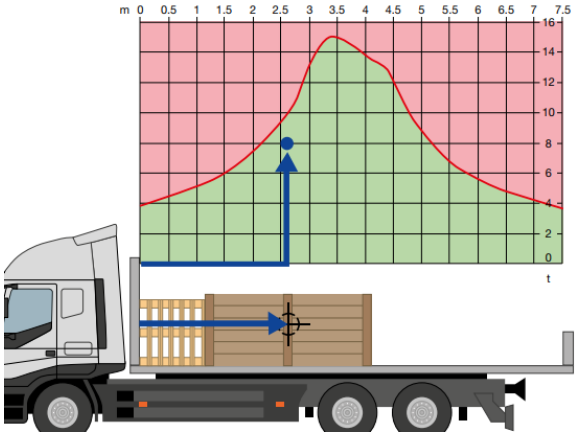
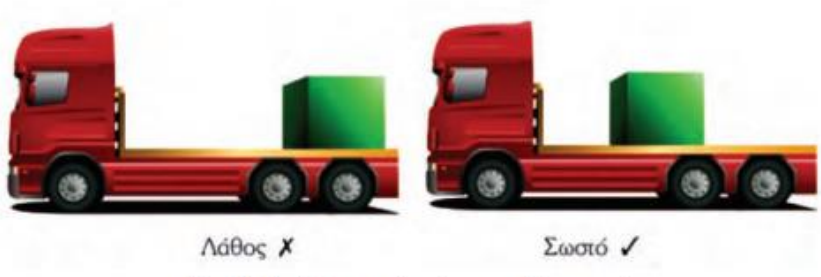


Fig. 44. Diagram of load distribution for vehicles and semi-trailer (IRU 2014, International Guidelines on Safe Load Securing for Road Transport)



Εικ. 38 Κατά μήκος της πλατφόρμας τοποθέτηση φορτίου.

Εικ. 39 Κατά πλάτος της πλατφόρμας τοποθέτηση φορτίου.

Εικ. 40 Τοποθέτηση φορτίου κατά μήκος της πλατφόρμας

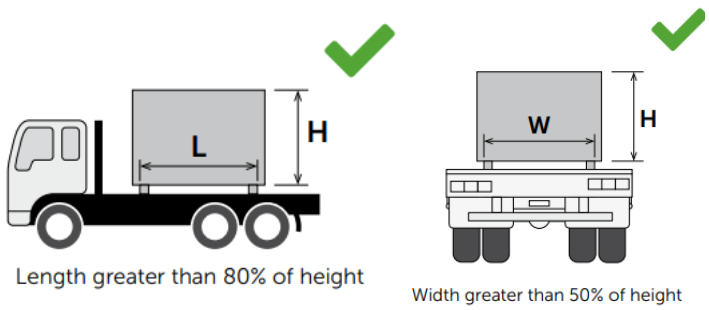


Fig. 45. Examples of correct load placemant for safe transport (Studybook 2013 'Road transport of dangerous goods' , Greek ministry of infrastructure, transport and networks)

13.1.2 Restraining methods and equipment

Restraining methods are allowed to be used to prevent the load from moving including sliding, tilting, rolling, wandering, substantial deformation and rotation.

Lashing

A lashing is a restraint device such as webbing, chain or wire rope that either ties load together or keeps load in contact with the load platform or any blocking device. Lashings should be positioned so that they are in contact only with the load to be secured and/or the securing points. They should not be bent over flexible items, side gates etc.

Fig. 46. Examples of lashing restraining method ((IRU 2014, International Guidelines on Safe Load Securing for Road Transport)

Blocking

Blocking or bracing means that the load is stowed to lie flush against fixed structures and fixtures on the load carrier. These may be in the form of headboards, sideboards, sidewalls or stanchions. The load can be stowed directly or indirectly by means of filling against the fixed blocking devices built into the load carrier and these prevent any horizontal movement of the load. In practice it is difficult to achieve a tight fit against the blocking devices and a small clearance usually remains. Gaps must be kept to a minimum, especially those to the headboard. The load should be blocked against the head board either directly or by the use of filler material in between.

Void spaces should be filled and may be favorably stuffed by empty pallets inserted vertically and tightened by additional timber battens as necessary. Material which may deform or shrink permanently, like rags of gunny cloth or solid foam of limited strength, should not be used for this purpose. Small gaps between unit loads and similar load items, which cannot be avoided and which are necessary for the smooth packing and unpacking

of the goods, are acceptable and need not to be filled. The sum of void spaces in any horizontal direction should not exceed 15 cm – height of standard pallet.

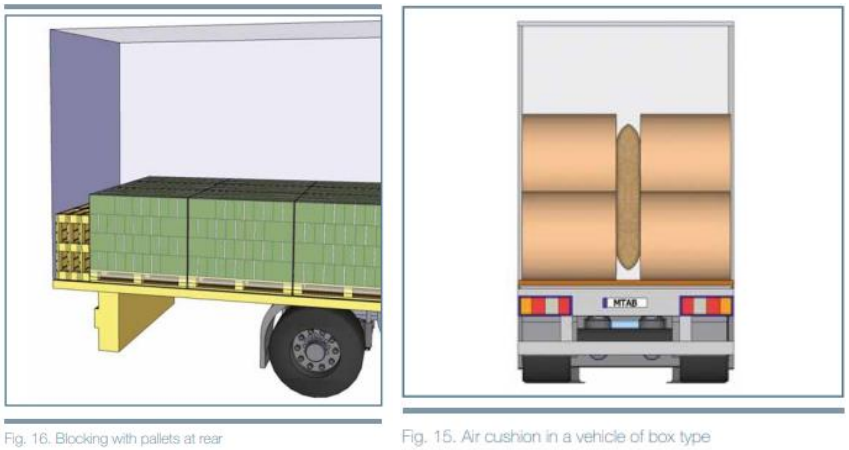


Fig. 16. Blocking with pallets at rear

Fig. 15. Air cushion in a vehicle of box type

Fig. 47. Examples of blocking restraining method (IRU 2014, International Guidelines on Safe Load Securing for Road Transport)

Combining two or more restraining methods is usually the most practical and cost-efficient way for effectively securing load. For instance, top-over lashing can be combined with base blocking. Care must be taken that the restraining forces from the combined restraining methods all apply concurrently and not one after the other. Each restraining method may be insufficient for safely securing the load if acting independently from the other(s).

Headboards can be used for direct (blocking) restraint. Headboards can be either rated to restrain a certain amount of weight or unrated. Unrated headboards can be reinforced using chains. When blocking loads against a headboard (or other freight) the gap must not be greater than 200 mm to be effective.

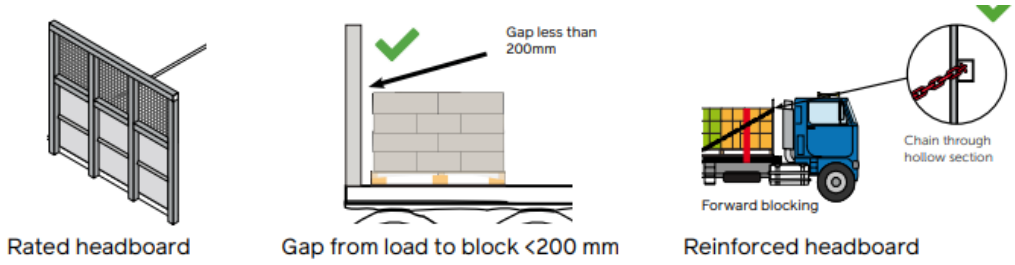


Fig. 48. Headboards equipment for restraining load (IRU 2014, International Guidelines on Safe Load Securing for Road Transport)

Webbing straps Webbing is a lightweight restraint system used throughout the transport industry to secure loads. Webbing assemblies include load-rated webbing material, together with end fittings, tensioning devices and a rating tag. The lashing capacity is

displayed on each assembly that complies with the relevant Australian Standard. Webbing straps are tensioned using either attached clip-on sliding winches, in-line tensioners or geared winches. Hand ratchets that operate by pulling the handle downwards will normally produce much more pretension (600 kgf) than push-up ratchets and standard truck winches (300 kgf). Straps with cuts of more than 10% of width, knotted, damaged, or significantly twisted should not be used.

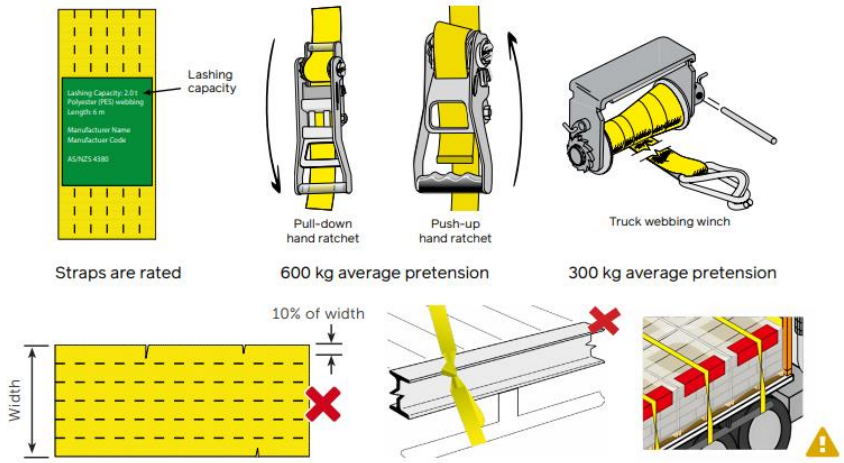


Fig. 49. Webbing equipment for restraining load (IRU 2014, Guidelines on Safe Load Securing)

Transport chain is a highly durable lashing type with low-stretch characteristics. Use chain to restrain strong rigid loads that are not easily damaged, or where the product can be protected from contact damage. Turnbuckles are screw tensioners operated by either a ratchet or sliding lever; they have no kickback when released and can achieve high tensions. Wherever possible, use common chain tensioners (such as turnbuckles) when using chain for tie-down restraint, as they will provide higher pretensions than standard webbing tensioners.

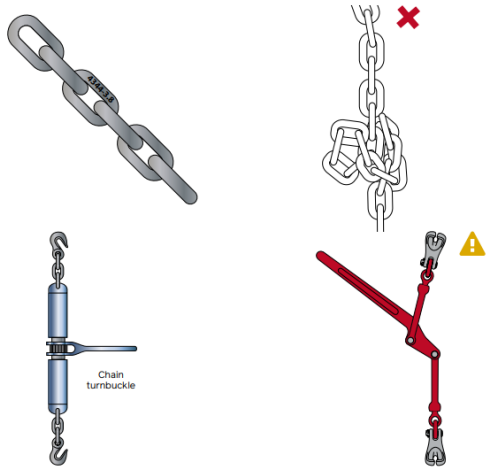


Fig. 50.Transport chains equipment for restraining (IRU 2014,Guidelines on Safe Load Securing)

13.1.3 International Road Transport Union (IRU) checklist for safe loading

Correct loading and securing of goods on road vehicles is essential to ensuring safe road transport. It is important that the securing of goods on a vehicle is carried out in accordance with recognized standards, and in compliance with relevant national legal requirements for road traffic, road safety and worker protection. In order to improve load safety in practice, the International Road Transport Union (IRU) has developed this checklist of harmonized tips for safe loading and load securing.

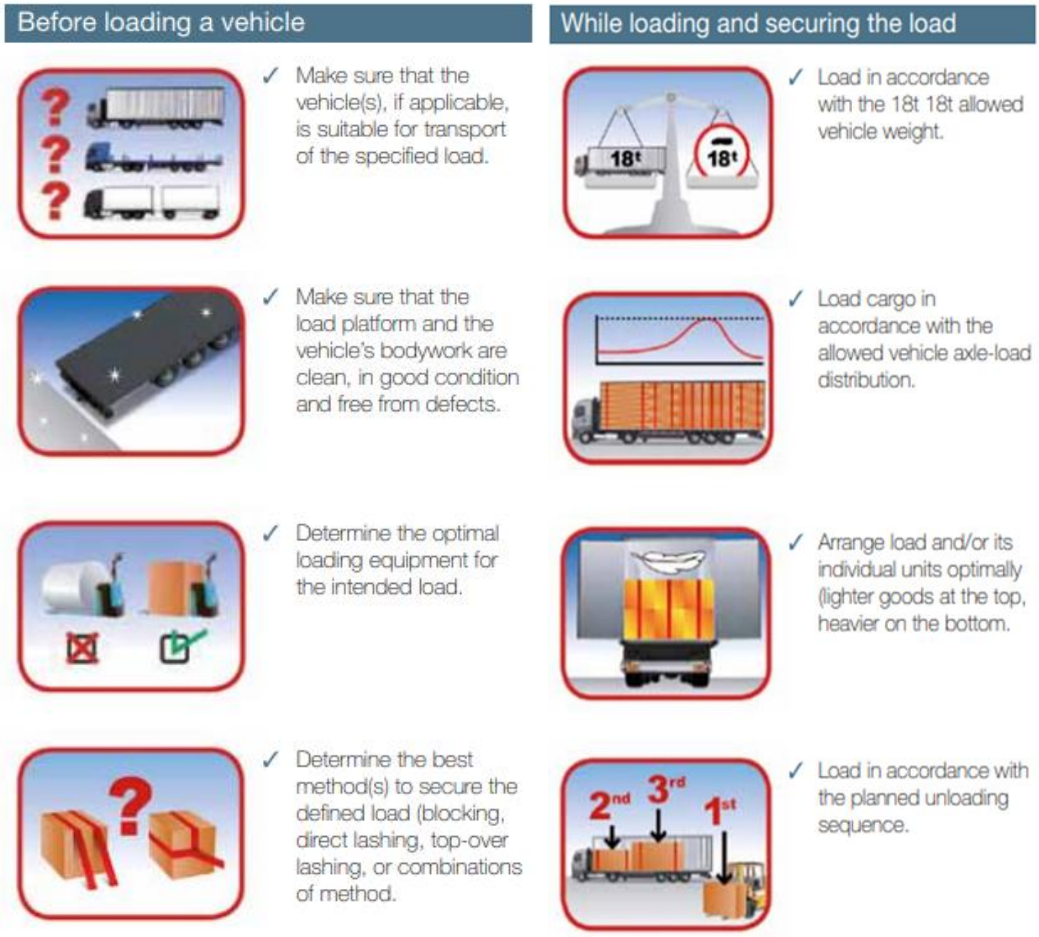


Fig. 51. International Road Transport Union (IRU) checklist for safe loading (IRU 2014, International Guidelines on Safe Load Securing for Road Transport)

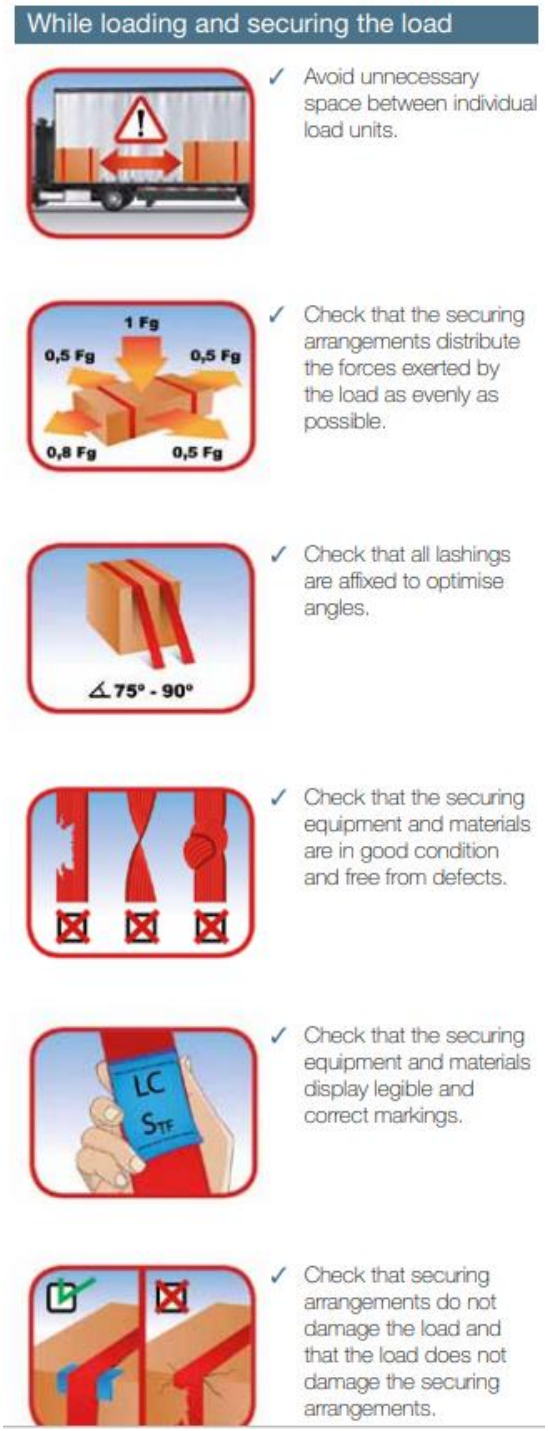


Fig. 52. International Road Transport Union (IRU) checklist for safe loading (IRU 2014, International Guidelines on Safe Load Securing for Road Transport)

13.2 Unloading

Unloading must not be carried out if an inspection of the vehicle, driver, load, transport or safety equipment reveals deficiencies that might affect the safety or
security of the unloading. Such deficiencies must be remedied before the commencement of unloading. In general, the operator must:

- Verify which goods are to be unloaded
- Check security of load and for damage to packaging
- Resecure dangerous goods not unloaded

13.3 Mixed loading prohibition

A major problem that arises when transporting dangerous goods is that some materials can react dangerously with others if accidentally mixed. For example, acids can react with metal salts to produce highly toxic gases. When mixed loading is permitted according to ADR, then they must be isolated and secured in such a way that it is impossible for them to mix or come into contact, even in the event of an accident. In general, the following goods must not be transported together:

-Cyanide, sulfuric or chloric acids.

-Flammable oxidizers.

-Flammable with toxic gases.

-Corrosives with gas cylinders-canisters under pressure.

-Food and animal feed may not be transported together with toxic or infectious substances, as well as with some other dangerous goods, unless feed has been effectively isolated from these commodities.

Packages bearing different danger labels shall not be loaded together in the same vehicle or container unless mixed loading is permitted according to the following Table based on the danger labels they bear.

NOTE 1: In accordance with 5.4.1.4.2, separate transport documents shall be drawn up for consignments that cannot be loaded together in the same vehicle or container.

NOTE 2: For packages containing substances or articles only of Class 1 and bearing a label conforming to models Nos. 1, 1.4, 1.5 or 1.6, irrespective of any other danger labels required for these packages, mixed loading shall be permitted in accordance with 7.5.2.2.

The Table in 7.5.2.1 of ADR shall only apply when such packages are loaded together with packages containing substances or articles of other classes.

Labels Nos.	1	1.4	1.5	1.6	2.1, 2.2, 2.3	3	4.1	4.1 + 1	4.2	4.3	5.1	5.2	5.2 + 1	6.1	6.2	7 A, B, C	8	9, 9A
1	See 7.5.2.2										d							b
1.4					a	a	a		a	a	a	a		a	a	a	a	a b c
1.5																		b
1.6																		b
2.1, 2.2, 2.3		a			X	X	X		X	X	X	X		X	X	X	X	X
3		a			X	X	X		X	X	X	X		X	X	X	X	X
4.1		a			X	X	X		X	X	X	X		X	X	X	X	X
4.1 + 1								X										
4.2		a			X	X	X		X	X	X	X		X	X	X	X	X
4.3		a			X	X	X		X	X	X	X		X	X	X	X	X
5.1	d	a			X	X	X		X	X	X	X		X	X	X	X	X
5.2		a			X	X	X		X	X	X	X	X	X	X	X	X	X
5.2 + 1												X	X					
6.1		a			X	X	X		X	X	X	X		X	X	X	X	X
6.2		a			X	X	X		X	X	X	X		X	X	X	X	X
7A, B, C		a			X	X	X		X	X	X	X		X	X	X	X	X
8		a			X	X	X		X	X	X	X		X	X	X	X	X
9, 9A	b	a b c	b	b	X	X	X		X	X	X	X		X	X	X	X	X

- X : *Mixed loading permitted*
- a : *Mixed loading permitted with 1.4S substances and articles*
- b : *Mixed loading permitted between goods of Class 1 and life-saving appliances of Class 9 (UN Nos. 2990, 3072 and 3268)*
- c : *Mixed loading permitted between safety devices, pyrotechnic of Division 1.4, compatibility group G, (UN No. 0503) and safety devices, electrically initiated of Class 9 (UN No. 3268)*
- d : *Mixed loading permitted between blasting explosives (except UN No. 0083 explosive, blasting, type C) and ammonium nitrate (UN Nos. 1942 and 2067), ammonium nitrate emulsion or suspension or gel (UN No. 3375) and alkali metal nitrates and alkaline earth metal nitrates provided the aggregate is treated as blasting explosives under Class 1 for the purposes of placarding, segregation, stowage and maximum permissible load. Alkali metal nitrates include caesium beryllium nitrate (UN 2464), calcium nitrate (UN 1454), magnesium nitrate (UN 1474) and strontium nitrate (UN 1507), nitrate (UN 1451), lithium nitrate (UN*

2722), potassium nitrate (UN 1486), rubidium nitrate (UN 1477) and sodium nitrate (UN 1498). Alkaline earth metal nitrates include barium nitrate (UN 1446)

Table 19. Approval and prohibition of mixed loading packages

13.4 TUNNEL RESTRICTIONS

Tunnels are categorized using the letters A to E. This categorization is based on the assumption that there are three major dangers in tunnels: (i) explosions, (ii) release of toxic gas or volatile toxic liquid (iii) fires.

The tunnel category, assigned by the competent authority (the NRA in Ireland) to a given road tunnel for the purpose of restricting the passage of transport units carrying dangerous goods, is indicated by means of road signs. Table below indicates the categories and the corresponding letter which appears on the approach to a tunnel.

Tunnel cat.	Restrictions	Sign	Traffic Sign
A	No restrictions for the transport of dangerous goods	No sign	–
B	Restrictions for dangerous goods which may lead to a **very large explosion**	Sign with additional panel bearing the letter B	
C	Restrictions for dangerous goods which may lead to a **very large explosion, a large explosion or a large toxic release**	Sign with additional panel bearing the letter C	
D	Restrictions for dangerous goods which may lead to a **very large explosion, a large explosion, a large toxic release or a large fire**	Sign with additional panel bearing the letter D	
E	Restrictions for all dangerous goods other than UN Nos. 2919, 3291, 3331, 3359 and 3373	Sign with additional panel bearing the letter E	

Table 20. Restrictions and sights based on Tunnel Category

All dangerous goods have a corresponding restriction code B, C, D, E, or a hyphen, indicated as '(-)'. When a hyphen is indicated instead of one of the restriction codes, the dangerous goods are not subject to any tunnel restriction (except for UN No's 2919 and 3331 – radioactive material). Table below shows the dangerous goods restriction codes and thus identifies the tunnels that cannot be entered (when two letters are indicated, the first applies to carriage in tanks and the second applies to packaged goods). When carrying several different substances, the dangerous goods with the most restrictive code dictate the restriction for the whole load (e.g. for a mixed load of dangerous goods with tunnel restriction codes of B, C and D, the full load will have a restriction code B).

Restriction code of the whole load*	Restriction
-	Passage allowed through all tunnels
B	Passage forbidden through B, C, D and E
C	Passage forbidden through C, D and E
D	Passage forbidden through D and E
E	Passage forbidden through E
B/D	Tank carriage: Passage forbidden through tunnels of category B, C, D and E Other carriage (e.g. packages): Passage forbidden through tunnels of category D and E
B/E	Tank carriage: Passage forbidden through tunnels of category B, C, D and E Other carriage (e.g. packages): Passage forbidden through tunnels of category E
C/D	Tank carriage: Passage forbidden through tunnels of category C, D and E Other carriage (e.g. packages) : Passage forbidden through tunnels of category D and E
C/E	Tank carriage: Passage forbidden through tunnels of category C, D and E Other carriage (e.g. packages): Passage forbidden through tunnels of category E
D/E	Bulk or tank carriage: Passage forbidden through tunnels of category D and E Other carriage (e.g. packages): Passage forbidden through tunnels of category E

Table 21. The meaning of restriction code of column 15 at Table A of ADR

13.5 Provisions for high consequence dangerous goods

“High consequence dangerous goods” are those which have the potential for misuse in a terrorist incident and which may, as a result, produce serious consequences such as mass casualties or mass destruction. The list of high consequence dangerous goods is provided in table below (Table 1.10.1. ADR)

Security plans

Carriers, consignors and other participants specified in 1.4.2 and 1.4.3 of ADR engaged in the carriage of high consequence dangerous goods shall adopt, implement and comply with a security plan that addresses at least the following elements

(a) specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities

(b) records of dangerous goods or types of dangerous goods concerned

(c) review of current operations and assessment of security risks, including any stops necessary to the transport operation, the keeping of dangerous goods in the [wagon/vehicle/vessel], tank or container before, during and after the journey and the temporary storage of dangerous goods during the course of intermodal transfer or transshipment between units

(d) clear statement of measures that are to be taken to reduce security risks, commensurate with the responsibilities and duties of the participant, including:

- training;
- security policies (e.g. response to higher threat conditions, new employee/employment verification, etc.)
- operating practices (e.g. choice/use of routes where known, access to dangerous goods in temporary storage (as defined in (c)), proximity to vulnerable infrastructure etc.)
- equipment and resources that are to be used to reduce security risks

(e) effective and up to date procedures for reporting and dealing with security threats, breaches of security or security incidents

(f) procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans

(g) measures to ensure the physical security of transport information contained in the security plan

(h) measures to ensure that the distribution of information relating to the transport operation contained in the security plan is limited to those who need to have it. Such measures shall not preclude the provision of information required elsewhere in RID/ADR/ADN.

NOTE: Carriers, consignors and consignees should co-operate with each other and with competent authorities to exchange threat information, apply appropriate security measures and respond to security incidents.

High consequence dangerous goods are those listed in the table below and carried in quantities greater than those indicated therein.

a Not relevant.

b The provisions of 1.10.3 do not apply, whatever the quantity is.

Class	Division	Substance or article	Quantity		
			Tank (*l*)	Bulk (kg)	Packages (kg)
1	1.1	Explosives	a	a	0
	1.2	Explosives	a	a	0
	1.3	Compatibility group C explosives	a	a	0
	1.4	Explosives of UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500	a	a	0
	1.5	Explosives	0	a	0
2		Flammable gases (classification codes including only the letter F)	3000	a	b
		Toxic gases (classification codes including letters T, TF, TC, TO, TFC or TOC) excluding aerosols	0	a	0
3		Flammable liquids of packing groups I and II	3000	a	b
		Desensitized explosives	0	a	0
4.1		Desensitized explosives	a	a	0
4.2		Packing group I substances	3000	a	b
4.3		Packing group I substances	3000	a	b
5.1		Oxidizing liquids of packing group I	3000	a	b
		Perchlorates, ammonium nitrate, ammonium nitrate fertilizers and ammonium nitrate emulsions or suspensions or gels	3000	3000	b
6.1		Toxic substances of packing group I	0	a	0
6.2		Infectious substances of Category A (UN Nos. 2814 and 2900, except for animal material)	a	0	0
8		Corrosive substances of packing group I	3000	a	b

Table 22. High consequence dangerous goods with their permitted carried quantities

14.Vehicle inspections

14.1 Type of vehicles transporting hazardous goods

The ADR divides up vehicles used for the transport of hazardous goods into vehicle types respectively transport units, depending on the intended purpose of use. The following quantities may be transported or carried on board without being subject to the requirements of ADR

- in fuel tanks fixed to the vehicle max. 1500 litres,
- in fuel tanks attached to the trailer max. 500 litres
- and in portable fuel tanks max. 60 litres.

In cross-border transport customs regulations must be complied with.

In ADR, Annex B, Chapter 9.1, sub-section 9.1.1.2 the various vehicle types are described.

"EX/II vehicle" or "EX/III vehicle" means a vehicle intended for the carriage of explosive substances and articles (Class 1)

"FL vehicle"

(a) A vehicle intended for the carriage of liquids having a flash-point of not more than 60 °C (with the exception of diesel fuel complying with standard EN 590:2013 + A1:2017, gas oil, and heating oil (light) - UN No. 1202 - with a flash-point as specified in standard EN 590:2013 + A1:2017) in fixed tanks or demountable tanks with a capacity exceeding 1 m³ or in tank containers or portable tanks with an individual capacity exceeding 3 m³; or

(b) A vehicle intended for the carriage of flammable gases in fixed tanks or demountable tanks with a capacity exceeding 1 m³ or in tank-containers, portable tanks or MEGCs with an individual capacity exceeding 3 m³; or

(c) A battery-vehicle with a total capacity exceeding 1 m³ intended for the carriage of flammable gases; or

(d) A vehicle intended for the carriage of hydrogen peroxide, stabilized or hydrogen peroxide, aqueous solution stabilized with more than 60 % hydrogen peroxide (Class 5.1, UN No. 2015) in fixed tanks or demountable tanks with a capacity exceeding 1 m³ or in tank-containers or portable tanks with an individual capacity exceeding 3 m³.

"AT vehicle"

(a) A vehicle, other than EX/III or FL vehicle or than a MEMU, intended for the carriage of dangerous goods in fixed tanks or demountable tanks with a capacity exceeding 1 m^3 or in tank-containers, portable tanks or MEGCs with an individual capacity exceeding 3 m^3; or

(b) A battery-vehicle with a total capacity exceeding 1 m^3 other than a FL vehicle;

MEMU: Mobile explosives manufacturing unit (MEMU), means a unit, or a vehicle mounted with a unit, for manufacturing and charging explosives from dangerous goods that are not explosives. The unit consists of various tanks and bulk containers and process equipment as well as pumps and related equipment. The MEMU may have special compartments for packaged explosives.

14.2 Certificate of approval

Conformity of EX/II, EX/III, FL and AT vehicles and MEMUs with the requirements of this Part is subject to a certificate of approval (certificate of ADR approval) issued by the competent authority of the country of registration for each vehicle whose inspection yields satisfactory results or has resulted in the issue of a declaration of conformity with the requirements of Chapter 9.2 in accordance with 9.1.2.1.

A certificate of approval issued by the competent authority of one Contracting Party for a vehicle registered in the territory of that Contracting Party shall be accepted, so long as its validity continues, by the competent authorities of the other Contracting Parties. The certificate of approval shall have the same layout as the model shown below Its dimensions shall be 210 mm × 297 mm (format A4). Both front and back may be used. The color shall be white, with a pink diagonal stripe.

CERTIFICATE OF APPROVAL FOR VEHICLES CARRYING CERTAIN DANGEROUS GOODS

This certificate testifies that the vehicle specified below fulfils the conditions prescribed by the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).

1. Certificate No.:	**2. Vehicle manufacturer:**	**3. Vehicle Identification No.:**	**4. Registration number** (if any)**:**

5. Name and business address of carrier, operator or owner:

6. Description of vehicle: [1]

7. Vehicle designation(s) according to 9.1.1.2 of ADR:[2]

EX/II EX/III FL AT MEMU

8. Endurance braking system:[3]

□ Not applicable

□ The effectiveness according to 9.2.3.1.2 of ADR is sufficient for a total mass of the transport unit of ____t[4]

9. Description of the fixed tank(s)/battery-vehicle (if any)**:**

9.1 Manufacturer of the tank:

9.2 Approval number of the tank/battery-vehicle:

9.3 Tank manufacturer's serial number/Identification of elements of battery-vehicle:

9.4 Year of manufacture:

9.5 Tank code according to 4.3.3.1 or 4.3.4.1 of ADR:

9.6 Special provisions TC and TE according to 6.8.4 of ADR (if applicable)[6]:

10. Dangerous goods authorised for carriage:

The vehicle fulfils the conditions required for the carriage of dangerous goods assigned to the vehicle designation(s) in No. 7.

10.1 In the case of an EX/II or EX/III vehicle [3] □ goods of Class 1 including compatibility group J □□ goods of Class 1 excluding compatibility group J

10.2 In the case of a tank-vehicle/battery-vehicle [3]

□ only the substances permitted under the tank code and any special provisions specified in No. 9 may be carried[5]

or

□ only the following substances (Class, UN number, and if necessary packing group and proper shipping name) may be carried:

Only substances which are not liable to react dangerously with the materials of the shell, gaskets, equipment and protective linings (if applicable) may be carried.

11. Remarks:

12. Valid until: Stamp of issuing service

Place, Date, Signature

[1] *According to the definitions for power-driven vehicles and for trailers of categories N and O as defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3) or in Directive 2007/46/EC.*

[2] *Strike out what is not appropriate.*

[3] *Mark the appropriate.*

[4] *Enter appropriate value. A value of 44t will not limit the "registration / in-service maximum permissible mass" indicated in the registration document(s).*

[5] *Substances assigned to the tank code specified in No. 9 or to another tank code permitted under the hierarchy in 4.3.3.1.2 or 4.3.4.1.2, taking account of the special provision(s), if any.*

[6] *Not required when the authorized substances are listed in No. 10.2.*

13. Extensions of validity	
Validity extended until	Stamp of issuing service, place, date, signature:

NOTE: *This certificate shall be returned to the issuing service when the vehicle is taken out of service; if the vehicle is transferred to another carrier, operator or owner, as specified in No. 5; on expiry of the validity of the certificate; and if there is a material change in one or more essential characteristics of the vehicle.*

Fig. 53. Certificate of approval for ADR vehicles

14.3 Annual technical inspection

The Annual Technical Inspection for EX/II, EX/III, FL and AT vehicles and MEMUs is a specific type of inspection designed to ensure that vehicles comply with safety regulations for the transportation of hazardous materials by road.

As ADR vehicle inspection bodies are approved by decision of the General Director of Transport of the Ministry of Infrastructure and Transport, University Laboratories of Higher Education Institutions with a knowledge subject of Mechanical Engineering or University Laboratories with a scientific field of vehicles/engines or Greek companies operating in accordance with the provisions of articles 46 of Law 4957/2022 (A' 141) and meet the conditions

a. It is accredited according to the standard ELOT EN ISO/IEC 17020:2012 (except 8.1.3) as a type A body by the Hellenic Accreditation System (ESYD). The Hellenic Accreditation System, verifies compliance with the conditions for approval herein and the procedures and obligations arising from the ADR Agreement and immediately informs the Ministry of Infrastructure and Transport of any revocation or suspension or termination of the accreditation of an ADR inspection body.

b. Has liability insurance coverage that includes risks in relation to the activities it carries out.

c. Employs at least the following technical personnel: one (1) technical manager, technically competent and experienced in the operation of the inspection body who has the overall responsibility for the compliance of the organization with standard 17020 and signs the issued certificates on behalf of the organization. One (1) inspector with appropriate qualifications, training, experience and knowledge of the requirements in the fields of activity of the entity that carries out the inspections and after their completion draws up and signs the issued certificates.

The technical inspection of a vehicle is attested by a single document, the vehicle's inspection certificate. If no major or dangerous deficiencies are detected a sticker indicating proof of technical test is attached to the vehicle by the public or private testing centers for vehicles (KTEO). They have different colors each year, according to a sequence repeated every six years. From 2019, the sequence is as follows: 2019 – orange, 2020 – blue, 2021 – yellow, 2022 – brown, 2023 – pink, 2024 – green, 2025 – orange. The vehicle driver must carry the vehicle registration document and the vehicle's

inspection certificate. The technical inspection certificate is valid up to one week after the expiry date written on it. The authenticity of the certificate authenticity can be checked with the Greek Ministry of Infrastructure and Transport, which keep record the KTEO test results. The check is done using the certificate serial number and the KTEO code number, both on the upper right part of the document. Inspection sticker is attached to the rear registration plate of the vehicle and indicates the year of the test and, on the upper part of the document, the month when the next periodic test is due.

Some aspects covered in an annual technical inspection for vehicles carrying dangerous goods:

-Brake System: Ensuring the effectiveness of the braking system is critical for heavy vehicles. Inspectors check brake pads, discs, drums, and the overall hydraulic or air brake system.

-Suspension System: The condition of the suspension components is examined to ensure stability and proper functioning, including the springs, shock absorbers, and other related parts.

-Steering System: The steering mechanism is checked for any signs of wear or malfunction. This includes examining the steering linkage, power steering system (if applicable), and related components.

-Lights and Signals: All lights, including headlights, taillights, brake lights, turn signals, and hazard lights, are inspected to ensure they are working correctly.

-Tires: The condition and tread depth of the tires are examined to ensure they meet safety standards. Overly worn or damaged tires can pose a significant risk on the road.

-Exhaust System: The exhaust system is inspected for leaks, and emissions are checked to ensure they comply with environmental regulations.

-Fuel System: Inspecting the fuel system for leaks or other issues is crucial to prevent potential fire hazards.

-Frame and Chassis: The vehicle's frame and chassis are checked for any signs of damage, corrosion, or structural issues.

-Electrical System: The entire electrical system, including the battery, wiring, and other components, is examined to ensure proper functionality.

-Fluid Levels: Inspectors check various fluid levels, including oil, coolant, brake fluid, and others, to ensure they are at appropriate levels.

CERTIFICATE TANK INSPECTION

□ initial / □ tank modification / □ periodic /□ intermediate / □ emergency

Certificate Number	Type-approval number
Principal's name	Manufacturer (Name, postal address)
Principal's address	Year of manufacture / Country of manufacture /
Principal's Phone	Serial number

Tank code
Special provisions

Apartment	1	2	3	4	5	6	7	8	9	10	Total
Capacity (L)											

Shell thickness (mm), required	Actually measured
Bottom thickness (mm), required	Actually measured
Partition thickness (mm), required	Actually measured

Test pressure (bar)		Maximum allowable working pressure (bar)	

Design pressure: minimum bar	Maximum bar
External pressure design: bar	

Safety valve overpressure setting (bar):	Vacuum valve vacuum setting (bar):
Checkpoints B	Test result C (PASSED/REJECTED/NOT APPLICABLE)
Examination of documents	
Checking design features	
Interior Inspection	
Foreign Inspection	
Hydraulic Pressure Test	

Vacuum test	
Water tightness test	
Determination of water capacity	
Service equipment inspection	
Inspection of frame or other portable structural equipment tank and container-tank	
Dynamic longitudinal crash test of portable tank	
Tank marking check	

Additional checks and tests
Observations or defects that can affect the safety of the tank or equipment
The tests were carried out in accordance with the applicable ADR and the EN 12972:2018 standard

Inspection result C (SUCCEEDED/REJECTED)	Inspection site

Date of next inspection	Type of follow-up inspection

DATE TECH. RESPONSIBLY INSTITUTION	DATE INSPECTOR

Table 23. Certificate tank inspection

ADR VEHICLE TEST CERTIFICATE

Certificate Number	Vehicle identification number
Principal's name	Vehicle manufacturer
Principal's address	Year of manufacture / Country of manufacture /
Principal's Phone	Vehicle type-approval number

Vehicle category	N1	N2	N3	O1	O2	O3	O4
Vehicle type: ADR	EX/II	EX/III	FL	AT	MEMU		
Factory engine type , production serial number				MAMFO full vehicle			
Overall length of full vehicle				Maximum width of a complete vehicle			

Tank elements		
Tank type (Fixed tank, Tanker Truck Parts, tank container, portable tank, Detachable tank, Tank in removable body Miscellaneous gas container Crucibles)	Tank serial number	Tank Inspection CertificateNumber / Date/
Transported materials		
UN number, name and description, class		

Vehicle specification checks	ADR	Test result (SUCCEEDED/REJECTED/ NOT APPLICABLE)	Documentation
Electrical equipment	9.2.2		
General provisions	9.2.2.1		
Cables	9.2.2.2.1		
Additional wiring protection	9.2.2.2.2		
Fuses and circuit breakers	9.2.2.3		
Accumulators	9.2.2.4		
Lighting	9.2.2.5		

Electrical connections between motor vehicles and trailers	9.2.2.6		
Tendency	9.2.2.7		
Battery main switch	9.2.2.8		
Permanent active circuits	9.2.2.9		
Braking equipment	9.2.3		
Fire hazard prevention	9.2.4		
General provisions	9.2.4.1		
Fuel tanks and cylinders	9.2.4.3		
Engine	9.2.4.4		
Exhaust system	9.2.4.5		
Vehicle retarder	9.2.4.7		
Combustion heaters	9.2.4.8		
Speed limitation device	9.2.5		
Coupling devices for motorized vehicles vehicles and trailers	9.2.6		
Additional requirements EX/II or EX/III	9.3		
Additional tank requirements	9.7		
Tethering	9.7.3		
Electrical equipotential connection (FL)	9.7.4		
Support surface - center of gravity	9.7.5.1		
Lateral stability (Reg. UN 111)	9.7.5.2		
Vehicle rear protection	9.7.6		
Combustion heaters	9.7.7		
Additional electrical equipment requirements	9.7.8		
Additional requirements (FL, EX/III)	9.7.9		
Additional MEMU Requirements	9.8		

Inspection site	
DATE TECH. RESPONSIBLY INSTITUTION	DATE INSPECTOR

Table 24. ADR vehicle test certificate

Fig. 54. Inspection sticker on the vehicles after the annual technical test

14.4 Private companies approved for technical inspections

Some of the companies that have been approved as an ADR vehicle technical control body in accordance with the Greek National Legislation, are mentioned bellow.

EUROCERT is an independent inspection, control and certification body and the largest purely Greek company active in this area. Having developed a high level of experience in the global market, it offers more than 50 certification and inspection services, in sectors including food, agricultural products, tourism, energy, industry, railways and transportations. Eurocert is the first certification body in Greece accredited by ESYD (National Accreditation System - Greece), UKAS (United Kingdom Accreditation Services - Britain) and SAAS (Social Accountability Accreditation Services - USA), while it is the first certification body worldwide that received accreditation from the Global GAP organization. With a continuous upward trend over the last 22 years, has established itself in Greece and abroad as a reliable control, inspection and certification body, with an active presence in more than 40 countries and more than 500 Greek and foreign inspectors. Investing in a development policy, has evolved into one of the most successful Greek multinational companies, with extroverted strategic planning, a high added value offer and continuous promotion of innovation.

EBETAM SA is the Greek multi-disciplinary multi-technological laboratory control and certification center for industrial and consumer products, materials, facilities and management systems. The company came from the merger of three technological entities with 25 years of experience in the field of material. It is a public interest company of a mixed nature, in whose share capital both public sector bodies and companies and private

companies participate. EBETAM operates under the supervision of the General Secretariat of Industry of the Ministry of Development.

InCert Ltd. is a provider of independent Inspection & Certification services - " third party inspection body ", technical inspections & certifications of Lifting and Handling Machinery, inspections & issuance of Test Sheets for Vehicles for the Transport of Dangerous Goods according to ADR, Pressure Equipment, Periodic Inspections of Simple Pressure Vessels, Conducting Non-Destructive Inspections (NDT) and evaluation of findings, as well as Certification of Welding Processes and Welders. The overall operation of the body is governed by the principles reflected in the Quality System, which is based on the requirements and specifications defined in the international standard ISO 17020, regulations of ESYD (National Accreditation System, EU regulations and the requirements of the applicable National and European legislation and technical standards. InCert Ltd., as an ADR Control Body (Accreditation section), issues, after a successful control, Test Sheets for Vehicles Transporting Hazardous Materials in accordance with the ADR agreement, which are forwarded to K.T.E.O. for the issuance of an ADR Approval Certificate.

GATS Ltd. (General Applications of Technology and Science)

Since 1970 the company has been solely occupied with the inspection of materials, trials, measurements and the supervision of technical work (mechanical engineering) with a view to improving the quality of the work. For the service of its clients, GATS Ltd. runs two laboratories, one in Athens and the other in Thessaloniki, both of which are fully equipped and staffed by competent technicians and scientists who have been trained on the specific subjects required, both in Greece and abroad. Since 1977 GATS Ltd is the sole supplier for non-destructive testing for the ELPE refinery in Thessaloniki.

GATS Ltd. company has worked for a number of years in various foreign countries, as Irak, S. Arabia, Libya etc. GATS Ltd has received the certificate of approval for ISO 9002 from Bureau Veritas Quality International Ltd. (BVQI) since 1991 for Inspections, Destructive and Non-Destructive Testing and Thermal Heat Treatment. Also, the accreditation certificate for ISO 17025 and EN 17020 from the Hellenic Accreditation Council (ESYD)

15. E-TOOL PROTEAS ADR CONTROL

The dissertation culminates with the presentation of the revised version of an already existing tool, E-tool Proteas ADR control, emphasizing the utilization of technology to streamline inspection processes and enhance compliance monitoring. By delineating the procedural steps and incorporating illustrative tables, this chapter exemplifies the practical application of digital solutions in bolstering regulatory oversight.

The control of ADR vehicles on the road during transport is carried out by the Traffic Police and includes the following checks :

• the ADR vehicle approval certificate

• the professional driver training certificate (ADR)

• the transfer documents

• the approval of a competent authority

• the driving period according to regulations (EU) no. 165/2014 EC and (EC) 561/2006 of the European Parliament and the Council respectively.

• the vehicle's registration details and the driver's driving license

• the offenses that apply to all goods vehicles

The control of the type of cargo transported, the method of loading provided for this cargo as well as all the other special conditions provided for in ADR are usually omitted because they are mostly incomplete and traffic officers are forced to limit themselves to the essentials.

15.1 Description

PROTEAS ADR CONTROL is an innovative online tool crafted as part of the European Program PROTEAS (LIFE09 ENV/GR/291) for the roadside inspections of vehicles transporting dangerous goods. This digital tool developed by Cognitive Ergonomics & Industrial Safety Laboratory (Director of the Laboratory, Professor Tom Kontogiannis) of the School of Production Engineering and Management of the Technical University of Crete with Project Manager the Dr. Papadakis Georgios and his coworkers. The Ministry of Infrastructure and Transport has approved the validity of this electronic tool for use and support in carrying out roadside checks by the competent authorities. Inspectors staff using the software (ADR CONTROL 2.0) via tablet or mobile have the possibility to easily and quickly carry out the compliance control of vehicles according to the ADR Agreement. However, the revisions of ADR Agreement correspondingly necessitated the

update of the electronic tool. Therefore, the structure of the already existing tool will be presented but with revised elements in accordance with the stipulations of the ADR 2023.

The software allows:

- ✓ Direct connection to databases of dangerous goods and the Ministry.
- ✓ Entry of all transported dangerous goods and control of specifications, notes, etc.
- ✓ Production of a predetermined list of violations for each type of controlled cargo (eg tanks, bulk, packaged, etc.).
- ✓ Entry of details of the SAMEE (Advisor for the Safe Transport of Dangerous Goods).
- ✓ Extracting a report of the results of each control with the points of violations and the imposed fines according to the official List of Enroute Controls for the Transport of Dangerous Goods.
- ✓ Compliance with historical control results
- ✓ The electronic tool (e-tool) PROTEAS ADR CONTROL, can significantly help the electronic authorities, such as the Traffic services, the companies charged with carrying out controls of the vehicles that fall under the ADR. Through a tablet or mobile phone, the traffic warden will be able to complete the check in a relatively short period of time, thus having the possibility to perform more checks within the working hours.

The use of the e-tool, in addition to reducing the time of the inspections of vehicles, also contributes to a more thorough inspections as it contains all the information that is necessary and is described in the 2,768 pages of Y.A. 200035/2023 (Government Gazette 4101/B`23.6.2023) (ADR 2023). On a practical level, the lack of the e-tool would mean that the traffic police officer would either have to have a copy of the ADR during the control and refer to the corresponding page depending on the type of vehicle and the transported substance, or have memorized and to be well acquainted with the whole of the said KYA. This would require large expenses in order to cover the cost of copies and a long period of time in the search for the necessary information, while the second case is practically impossible.

Further features of the e-tool include immediate printing of test results via a portable printer which is connected to the electronic device containing the software. This process is very simple as the e-tool gives the option to the user to print the results after the full

registration of the necessary data and after the imposition of any fines. The form that is printed is the checklist of annex II of the Υ.Α Γ6/57084/1981/2018 (Government Gazette 3135/Β΄ 31-7-2018) (APPENDIX II) which according to article 7 is mandatory to be completed by the control authorities after the end of each control. This document is printed out and completed and the traffic police officer needs to add with handwriting the name of the controlled and/or offender and the vehicle's license plate. In addition, the e-tool software keeps a record of every check carried out by the electronic authorities and is entered into it, so that the corresponding penalties are imposed in case of a recurrence, as defined by the ADR 2023. In this graduate thesis you can find the inspection list form in APPENDIX I on the last pages.

The trial application of the e-tool in Greece was carried out by traffic police officers, on July 4, 2018, in Elefsina, in the presence of employees of the Ministry of Infrastructure and Transport, the Directorate of Transport and Communications of the Central Sector of Athens, and the research team of Technical University of Crete accountable for the project. During the test, 7 vehicles were checked and it was found that the PROTEAS ADR CONTROL platform works smoothly in real conditions. However, despite the encouraging results from its implementation, until today this electronic tool or another similar one has not been implemented as there are various issues of responsibilities between the ministries.
As can be seen from the above, the use of such an electronic tool by the e-authorities would significantly help both in reducing the overall control time and in conducting thorough checks.

The first part of the e-tool is an updated database in accordance with the ADR 2023, where all dangerous substances of table A of chapter 3.2 of the ADR 2023 have been entered, so the inspector be able to know the required requirements which must be observed during the transport of the specific goods. The software does not cover the cases of explosive and radioactive transport due to their special requirements. Some basic definitions that will be the databases of the electronic tool are presented.

- UN Number: "UN Number" is the four-digit identification number of substances and species according to the UN Model Regulations.

- Name and description (technical name): is a recognized chemical name, if necessary, a recognized biological name or other name correctly used in scientific and technical manuals, journals and texts.
- Risk class (Class): grouping of risk into 9 categories according to risks (class 1 – class 9)
- Packing group (Packing group): 3 categories I, II, III depending on the degree of risk
- Special Provisions: special requirements for the handling of each material
- Vehicle (ADR Vehicle): a vehicle with a special approval certificate for the transport of tanks and other bulk cargo.
- Identification number: Indicates the type of risk or risks (primary/secondary) involved in the transport of the material.
- Tunnel restrictions: classification of a tunnel along the route of the vehicle which indicates whether or not it is allowed to pass through it, based on the transported material

For the smooth operation of the software, internal and external databases (functional requirements) are required, which will be automatically connected to the software and will be available to extract useful data during the inspection. Specifically:

- **The updated Internal databases (Bases I.a, I.b, I.c)**: refers to the characteristics of dangerous goods that are defined as basic specifications for their transport based on ADR.
- **The updated External databases (Bases II.a, II.b)**: refers to vehicle and driver data according to data from the Ministry of Transport Infrastructure and Networks (YPYPMEDI).

15.2 Updated Internal and External data-bases

Internal Base I.a

Introduction of Table A of Chapter 3.2, of the ADR Agreement which includes codified requirements that must be applied for the safe transport of each dangerous good according to its UN number if it is permitted. This list consists of the following 20 columns:

Contents Table A

Column 1	UN Number
Column 2a	Name and description - Greek
Column 2b	Name and description - English
Column 3a	Class
Column 3b	Classification code
Column 4	Packing Group
Column 5	Labels
Column 6	Special provisions
Column 7a	Limited quantities
Column 7b	Excepted quantities
Column 8	Packing instructions
Column 9a	Special packing instructions
Column 9b	Mixed packing instructions
Column 10	Instructions for portable tanks and bulk containers
Column 11	Special provisions for portable tanks and bulk containers
Column 12	Tank code
Column 13	Special provisions for tank
Column 14	Vehicle for tank carriage
Column 15	Transport category (Tunnel restriction code)
Column 16	Special provisions for carriage - Packages
Column 17	Special provisions for carriage - Bulk

Column 18	Special provisions for carriage – Loading, unloading and handling
Column 19	Special provisions for carriage - Operation
Column 20	Hazard identification number

Table 25. The updated Internal Base I.a of Proteas tool

Internal Base I.b

It includes an alphabetical list of the substances of the ADR Agreement. This list will consist of the following 5 columns (Table B):

Column 1 Name and description (Technical name) - Greek

Column 2 Name and description (Technical name) - English

Column 3 UN Number

Column 4 Class

Column 5 Remarks

Name and description Greek	Name and description - English	UN Number	Class	Remarks
ΠΕΡΙΒΑΛΛΟΝΤΙΚΑ ΕΠΙΚΙΝΔΥΝΕΣ ΟΥΣΙΕΣ ΥΓΡΕΣ Ε.Α.Ο	ENVIRONMENTAL HAZARDOUS SUBSTABCES LIQUID, N.O.S	3082	9	

Table 26. The updated Internal Base I.b of Proteas tool

The ability to search for information on the transported material will be carried out through the Find or Search function, i.e. the ability to search for ADR information for a substance via UN Number or via the name of the substance in Greek or English. By entering the UN Number or the name of the substance in Greek or English, the user will be able to display all the relevant coded information (corresponding line of Table A, Chapter 3.2 of the ADR).

Internal Base I.c

This table is one of the most important sources of data for inspectors, because by entering the transported goods and matching the necessary risk data via search, the software will automatically inform the inspector whether loading is allowed or not based on this table. The mixed loading is permitted according to the following Table

Labels Nos.	1	1.4	1.5	1.6	2.1, 2.2, 2.3	3	4.1	4.1 + 1	4.2	4.3	5.1	5.2	5.2 + 1	6.1	6.2	7 A, B, C	8	9, 9A
1	See 7.5.2.2										d							b
1.4					a	a	a		a	a	a	a		a	a	a	a	a b c
1.5																		b
1.6																		b
2.1, 2.2, 2.3		a			X	X	X		X	X	X	X		X	X	X	X	X
3		a			X	X	X		X	X	X	X		X	X	X	X	X
4.1		a			X	X	X		X	X	X	X		X	X	X	X	X
4.1 + 1								X										
4.2		a			X	X	X		X	X	X	X		X	X	X	X	X
4.3		a			X	X	X		X	X	X	X		X	X	X	X	X
5.1	d	a			X	X	X		X	X	X	X		X	X	X	X	X
5.2		a			X	X	X		X	X	X	X	X	X	X	X	X	X
5.2 + 1												X	X					
6.1		a			X	X	X		X	X	X	X		X	X	X	X	X
6.2		a			X	X	X		X	X	X	X		X	X	X	X	X
7A, B, C		a			X	X	X		X	X	X	X		X	X	X	X	X
8		a			X	X	X		X	X	X	X		X	X	X	X	X
9, 9A	b	a b c	b	b	X	X	X		X	X	X	X		X	X	X	X	X

- X : *Mixed loading permitted*
- a : *Mixed loading permitted with 1.4S substances and articles*
- b : *Mixed loading permitted between goods of Class 1 and life-saving appliances of Class 9 (UN Nos. 2990, 3072 and 3268)*
- c : *Mixed loading permitted between safety devices, pyrotechnic of Division 1.4, compatibility group G, (UN No. 0503) and safety devices, electrically initiated of Class 9 (UN No. 3268)*
- d : *Mixed loading permitted between blasting explosives (except UN No. 0083 explosive, blasting, type C) and ammonium nitrate (UN Nos. 1942 and 2067), ammonium nitrate emulsion or suspension or gel (UN No. 3375) and alkali metal nitrates and alkaline earth metal nitrates provided the aggregate is treated as blasting explosives under Class 1 for the purposes of placarding, segregation, stowage and maximum permissible load. Alkali metal nitrates include caesium beryllium nitrate (UN 2464), calcium nitrate (UN 1454), magnesium nitrate (UN 1474) and strontium nitrate (UN 1507), nitrate (UN 1451), lithium nitrate (UN*

2722), potassium nitrate (UN 1486), rubidium nitrate (UN 1477) and sodium nitrate (UN 1498). Alkaline earth metal nitrates include barium nitrate (UN 1446)

Table 27.The updated Internal Base I.c of Proteas tool

External bases consist of data that comes from competent departments of the Ministry of Infrastructure and Transport and concerns the following:

External Base II.a - Database with ADR vehicle certificates: the specific database will be able to be connected to the e-tool via the Internet so that the respective auditor, declaring the vehicle's license plate, will be able to automatically confirm whether there is a valid certificate, suitable for the particular transport.

External Base II.b - Database of certificates of drivers of vehicles transporting dangerous goods: the specific database, which is kept at the IT Directorate of the Ministry, will be connected to the software and by entering the driver's details it will be automatically confirmed both authenticity of the data as well as their validity.

15.3 Inspection steps

The second part of the e-tool an electronic platform in which the inspector has the possibility, through the selection of specific parameters, to identify the revised violations and impose the corresponding fines according to the category of risk of violation (I, II, III).

Risk category I (1): risk of death, serious injury or significant environmental damage

Risk category II (2): risk of serious injury or significant environmental damage

Risk category III (3): low risk of injury or damage to the environment

The software does not cover the cases of explosive and radioactive transport due to their special requirements

A detailed description follows in the form of actions - steps to understand the way the tool works and is used.

15.3.1 Step 1. Check of the documents

Initially, the inspector asks the driver of the transporter for the following documents, which according to the current regulations must accompany the transport:

- Waybill and/or CMR and/or transport document

- Vehicle license
- KTEO & insurance policy

15.3.2 Step 2. Register a new check

- Registration of the mode of transport: Packaged, Bulk, Tank

With this option, point 11 of the list is automatically completed

The term PACKAGED loads mean the following:

- Packages and containers (except IBCs and large packages) with the letter "P" in Column (8): drums, boxes, bags, containers, combination of packages).
- lightweight metal packaging with the letter "R" in Column (8).
- IBCs (intermediate bulk containers) with the letter "IBC" in Column (8)
- large packages with the letter "LP" in Column (8). Collection containers, empty containers dirty

The term BULK loads mean the following:

The method of data entry concerns exclusively the transport of unpackaged solid bulk in a container. Substances that may become liquid during transport may not be transported in bulk. Goods may not be carried in bulk in bulk containers, containers or vehicles unless:

- a special provision, identified by the code BK, which expressly allows this mode of transport is referred to in Column (10) of Table A and the relevant conditions of chapter 7.3.2 are additionally satisfied.

  Codes BK1 and BK2 in Column (10) of Table A of Chapter 3.2 have the following meaning:

  BK1: Allowed to be carried in bulk in covered bulk containers,

  BK2: Allowed to be carried in bulk in closed bulk containers.
- A special provision, identified by code VV, which expressly allows this mode of transport is referred to in Column (17) of Table A.

The term TANK loads mean the following:

The data entry method concerns the transfer of liquid or gaseous preparations in tanks.

- Tank: Tank means a shell (enclosure), including its service equipment and structural equipment. When the term "tank" is used by itself, it includes tank-container, portable

tank, detachable tank and fixed tank, including tanks which are components of a tank-carrying vehicle or an MEGCs

- Tank-container: The term "Tank-container" means a type of transport equipment that meets the definition of the term "container" and consists of a housing and equipment, including equipment that facilitates the movement of the tank-container without a significant change in behavior and is used for the transport of liquid, gaseous substances in powder or granules, and which when used for the transport of gases as defined in paragraph 2.2.2.1.1, has a capacity of more than 0.45 m3 (450 litres).

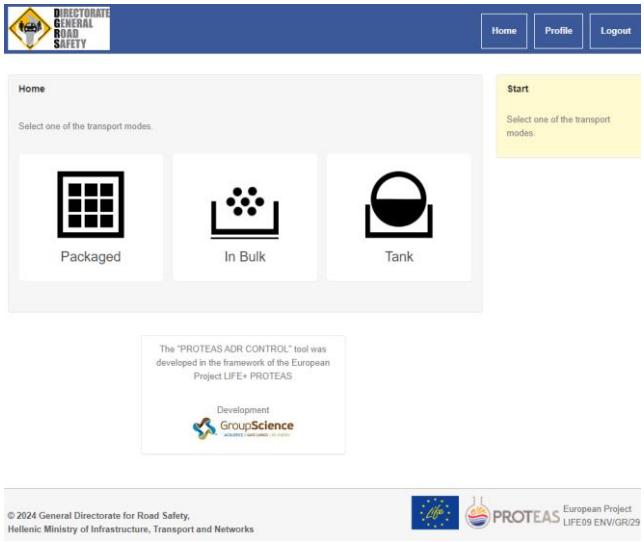


Fig. 55. Registration of the mode of transport: Packaged, Bulk, Tank

15.3.2 Step 3. Registration of control elements (plates, driver, vehicle details) and check for combined transport (if the transport includes sea or air transport)

Points 1 – 6 and 8 of the new checklists are completed electronically by the inspector based on the information included in the documents at step 1, received from the driver, namely:1. Place of control, 2. Date, 3. Time 4. State license plate and vehicle registration number, 5. State license plate and trailer / semi-trailer registration number, 6. Transport company / Address, 8. Driver/co-driver

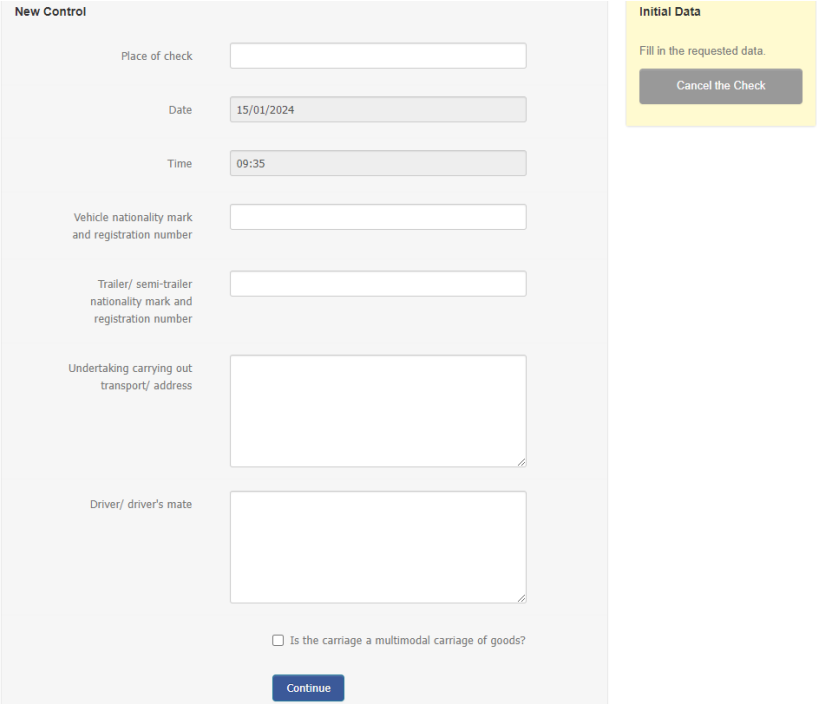


Fig. 56. Registration of control elements (plates, driver, vehicle details, etc.)

15.3.4 Step 4. Search for transported goods according to the mode of transport and connection to software databases

The process is repeated for all goods transported separately:

- UN entry by the controller based on the transport documents provided to him by the driver. Alternatively, it will be possible to search for dangerous goods by their name in Greek and/or English.
- UN connection with Table A of Chapter 3.2 (Base I.a) with automatic control of goods approved for transport, product congestion control and exceptions (checks for exceptions 1.1.3.6, limited and excluded quantities). So the electronic platform automatically display all the necessary information per substance , i.e. name (column 2), class (column 3), classification code (column 3b) , packing group (column 4), special provisions (columns 6, 16, 18), transport category (column 15), Limited quantities (Column 7a), Excluded quantities (Column 7b), as well as the required markings.
- As mentioned, a check is carried out on the goods approved for transport regarding the permissible or non-permissible transport of dangerous goods, through the electronic database II.a of ADR and Point 19 of the checklist is automatically filled in. Dangerous goods that are not acceptable according to ADR and the inspection is automatically stopped are presented in the following table:

UN Number	Class
1798	8
2186	2
2249	6.1
2421	2
2455	2
3097	4.1
3100	5.1
3121	5.1
3127	4.2
3133	4.3
3137	5.1
3255	4.2

Table 28. Dangerous goods that are not acceptable according to ADR and the inspection is automatically stopped

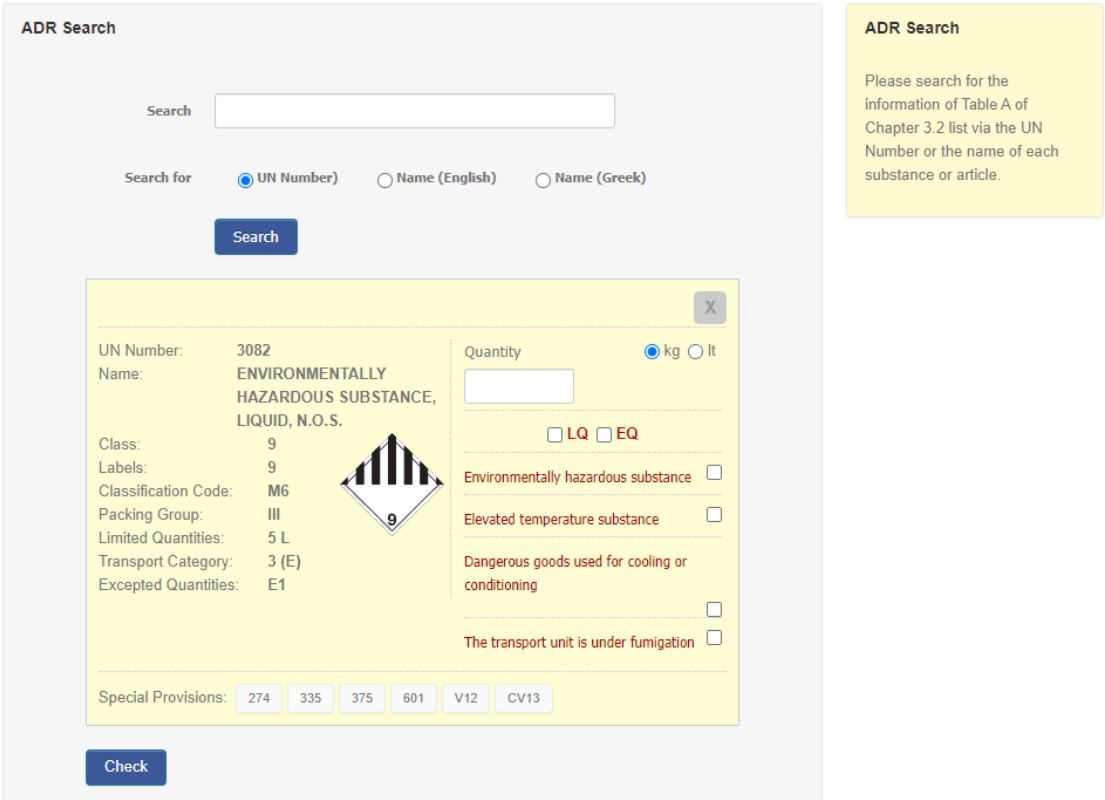


Fig. 57. Display of all the necessary informations per substance

15.3.5 Step 5. Enter total net weight (kg= solid, litre= liquid) per UN

When the process of all UNs is completed based on the information provided in the transport document, Point 13 (Total quantity of dangerous goods per transport unit) of the checklist is automatically filled.

A control of the total transported quantity per material is followed based on the table of paragraph 1.1.3.6 of ADR – Point 12 of the list.

Base 1.a includes information about the transport category (Column 15), where:

• Category O: does not fall under an exception, so it is considered dangerous from the minimum possible amount

• Category 1: quantities of 50 kg/liter in total or 20 kg/liter for specific un

• Category 2: quantities of 333 kg / liters are excluded

• Category 3: quantities of 1000 kg / liters are excluded

The program with the introduction of UN knows from column 15 of base I.a to which transport category it belongs. Each category corresponds to a risk factor which is used in the case of combining goods of different transport categories.

Transport Category	Multiplying Factor Ei
1	50
1*	20
2	3
3	1
Sum of dangerous goods must not exceed 1,000	

* For UN No's 0081, 0082, 0084, 0241, 0331, 0332, 0482, 1005 and 1017

Ei : Risk level

Bi: Amount of transported goods.

Table 29. Risk factor for each transport category the case of combining goods of different transport categories

When dangerous goods belonging to different transport categories are transported in the same transport unit, the **sum Σ (Bi x Ei)** is calculated

- the amount (Bi) of transport category 1 substances multiplied by 50 (Ei)
- the amount of substances of transport category 1* note a (1.1.3.6) multiplied by 20
- the amount of transport category 2 substances multiplied by 3
- the amount of transport category 3 substances

By entering the quantities of the transported materials, the system automatically solves the above equation and draws a conclusion as to whether the transport falls within the

exception 1.1.3.6. When the conclusions are drawn, the result is displayed in a list format as well as the transfer obligations by matching the control points of the list. So the auditor has a complete picture of the basic requirements. Then the process is carried out by completing a check list per control point, as will be analyzed below.

If **Σ >1000**, the ADR check is carried out based on the "**Packaged Goods" checklist**

If **Σ ≤1000**, it is considered an exception according to 1.1.3.6 while the ADR check is carried out based on the list of checks "**Packaged Goods falling under the exception 1.1.3.6"** and the following is required

- Certified (Un approved – Column 8) and marked packages (column 5) - Point 24 & 25
- Transfer document stating the exception – Point 14
- Fire extinguisher for flammability classes A, B and C, minimum capacity 2 kg - Point 26

15.3.6 Step 6. Option to select (check) the following:

✓ Substance hazardous to the environment

✓ Substance at elevated temperature

✓ Dangerous goods for refrigeration or air conditioning

✓ The vehicle has been fumigated

If the option is YES in one or more of the above cases, based on the information written in the transport document, the corresponding special sign will appear in the electronic tool, which the inspector must check if it is present in the package (or in the vehicle if this is the sign that concerns the disinfection of a vehicle with smoke). At this point it is emphasized that a material which is hazardous to the environment for road transport in sea transport is called a marine pollutant. Based on the latter there is a high probability that when the transport is multimodal it will be listed as a marine pollutant in the combined transport document.

- ✓ **LQ**: Dangerous goods packed in limited quantities (Limited quantities) according to Chapter 3.4 of ADR. If there is in this category, the special sign will appear which the inspector must check if it is present in the package.

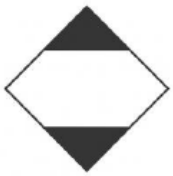


Fig. 58. Sign for goods packed in limited quantities

- ✓ **EQ:** Dangerous goods packed in excepted quantities (Excepted quantities) according to Chapter 3.5 of ADR. If there is in this category, the special sign will appear which the inspector must check if it is present in the package.

Fig. 59. Sign for goods packed in excepted quantities

The permitted LQ and EQ quantities are also shown, so that the auditor is able to judge whether the transported goods actually meet the quantity limits. The dual obligation for LQs of 30 kg of outer packaging or 20 kg of heat-shrinkable packaging will also appear in a banner format. ADR specifies an “E code” for all dangerous goods in Chapter 3.2, Table A, Column 7(b), which specifies the excepted quantities for outer and inner packaging, indicated in Table 30.

CODE	Maximum net quantity per inner package (in grams for solids and in ml for liquids and gases)	Maximum net quantity per outer packaging (in grams for solids and in ml for liquids and gases, or sum of grams and ml in case of mixed packaging)
E0	Carriage as an exempted quantity is prohibited	Carriage as an exempted quantity is prohibited
E1	30	1000
E2	30	500
E3	30	300
E4	1	500
E5	1	300

Table 30. Maximum net quantity per inner and outer packaging base on excepted code (E)

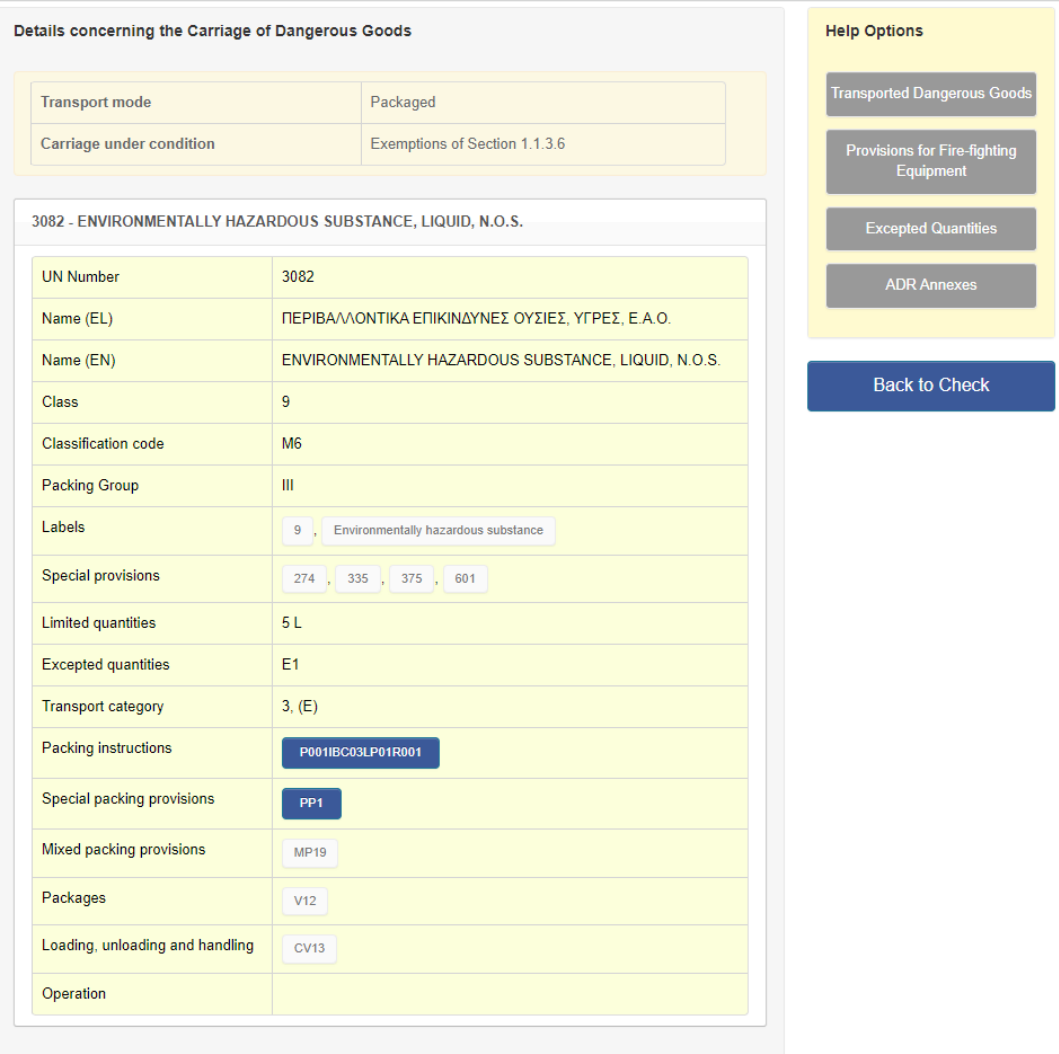


Fig. 60. Display in detail important informations for examined substance

15.2.7 Step 7: Violation check based on the suitable Checklist

Based on whether it falls under the exceptions, the corresponding platform of questions - checks with the points in the list is also loaded. It is noted that, the six (6) checklists of violations were developed based on the mode of transport (packaged, bulk, tank) & exceptions according to the European ADR Agreement.

• Updated List of inspections - violations for Packaged Goods

• Updated List of checks - violations for Packaged Goods falling under exception 1.1.3. 6

• Updated List of checks - violations for Packaged in Limited Quantities LQ

• Updated List of checks - violations for Packaged in Excluded Quantities EQ

• Updated Checklist - violations for Bulk Cargo

- Updated List of controls - violations for Tanks

The new checklists include:
-Checkpoints with ADR violations,
-References to the sections of the ADR that specify the exact requirements-specifications for each control point,
-Grading of offenses according to seriousness and
-Instructions to inspectors.

Violation checks concern the following 13 sections:

- Transport document
- Written instructions
- Competent authority approval-permit
- ADR vehicle approval certificate
- Professional driver training certificate
- Approved goods to be transported and mode of transportation
- Loading, cargo securing and handling
- Leakage of goods or deterioration of hoses or restraints
- Packaging/package markings
- Superstructure / vehicle markings
- General safety equipment
- Additional equipment required for certain classes
- Fire extinguishers

In total the infringement checks include 51 checkpoints (violations) for Packaged Goods, 45 checkpoints for Bulk Cargo and 43 checkpoints for Tanks.

All the updated List of inspections – violations in accordance with the stipulations of the ADR 2023 are presented with the form of tables in detail in APPENDIX II at the end of dissertation.

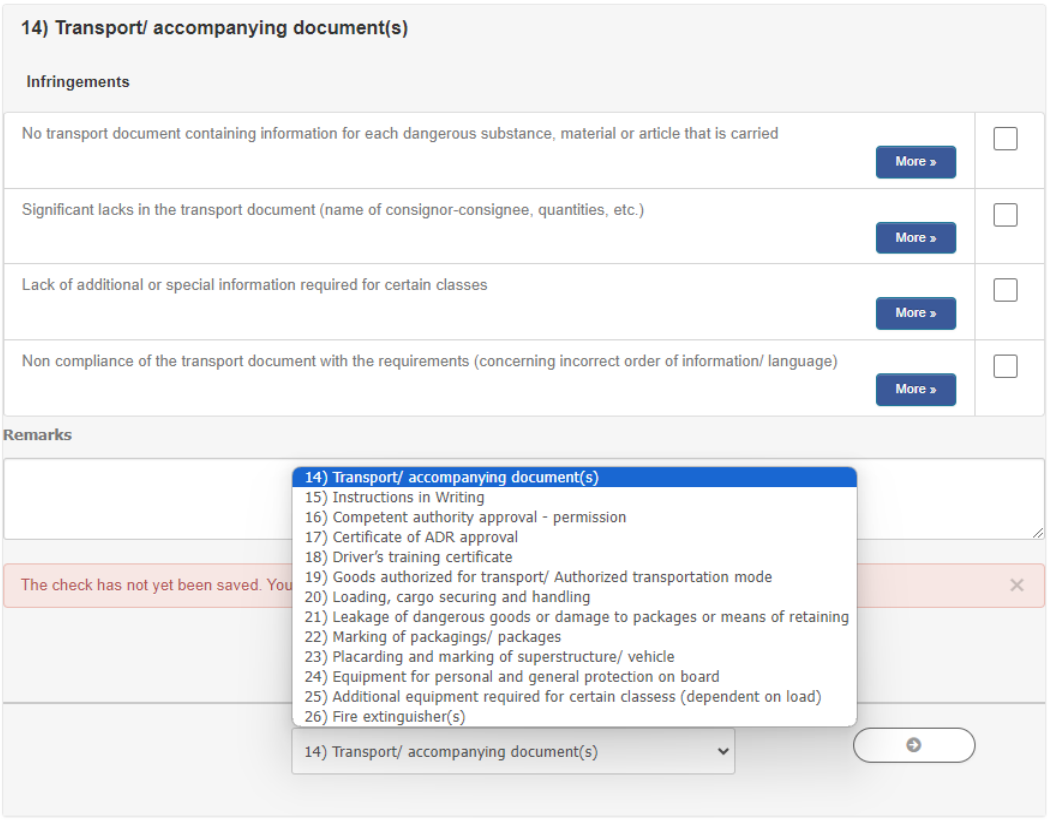


Fig. 61. Displaying the violation checks for Packaged Goods

15.3.8 Step 8. End of control

Registration of details of the Safe Transport of Dangerous Goods Advisor (SAMEE), the Sender and the Recipient of the cargo in case of detection of violations. In this case the auditor should fill in the fields of the electronic tool concerning the following Points of the checklist:

- Point 7: Safe Transport of Dangerous Goods Consultant / telephone
- Point 9: Sender, address, place of loading
- Point 10: Consignee, address, place of unloading

Automatic production of En-route Control Results Report and export of the En-route Control List of Dangerous Goods Transport for granting to the Driver.

15.4 Results

Preview Results

The roadside check has not yet been saved! You must first click Save!

Data of roadside check

Place of check	CHANIA
Date	22/01/2024
Time	10:36
Vehicle nationality mark and registration number	YV2A4B4A4RB237856
Trailer/ semi-trailer nationality mark and registration number	950625274
Undertaking carrying out transport/ address	MAVRAKAKIS ANTONIS
Driver/ driver's mate	PAPADOPOYLOS GIANNIS
Is the carriage a multimodal carriage of goods?	No
Transport mode	Packaged
Carriage under condition	Exemptions of Section 1.1.3.6
Total quantity of dangerous goods by transport unit	100 kg

A PART OF THE INSPECTIONS LIST

1. Place of control CHANIA 2. Date 22/01/2024 3. Time 10:36

4. State license plate and vehicle registration number YV2A4B4A4RB237856

5. State license plate and trailer/semi-trailer registration number 950625274

6. Transport company / address MAVRAKAKIS ANTONIS

7. Safe Transport of Dangerous Goods Consultant /phone .....

8. Driver / passenger PAPADOPOYLOS GIANNIS

9. Sender, address, place of loading (1)(2).....

1 Consignee, address, place of unloading (1) (2) .....

11. Mode of transport ☐ bulk ■ package ☐ tank

12. Transfer under regime ■ 1.1.3.6. ☐ LQ ☐ EQ ☐ no

13. Total quantity of dangerous goods per transport unit 100 kg

14. Transfer document ■ checked ☐ no object

Violation detected:

☐ Absence of a document listing the transported dangerous goods

☐ Significant deficiencies in the transport document (consignor-consignee, quantities)

☐ Lack of additional or special information required for certain classes

☐ Document non-compliance with requirements (incorrect order of information/ language)

16. Competent authority approval-permit ■ checked ☐ not relevant

Violation detected:

☐ Absence of competent authority approval required for certain substances

Fig. 62 Preview results of an example roadside check

The use of the electronic tool achieves a quick and effective control of the vehicles carrying dangerous goods. However, must be operated by persons who have received training in both ADR hazardous road transport and loading safety, in order to minimizes margins of error. An important advantage of the software is that it is dynamic, so any time corresponding elements can be added or removed, be updated based on the new changes of ADR such as this last revision of the tool presented. It will also be able to be extended for categories of classes not currently included such as Classes 1 (Explosives and articles) and 7 (Radioactive materials). Key features of the updated online tool include:

- ✓ Updated databases with the characteristics of dangerous goods defined as basic specifications for their transport under ADR 2023.
- ✓ Online connection to the Ministry databases for the control of ADR vehicle approval certificates and professional training of drivers.
- ✓ Registration of all transported dangerous goods and their quantity - Automatic control of approved goods and cargo loading.
- ✓ Ability to check all specifications, exemptions, markings and special provisions of transported goods depending on the mode of transport by entering the UN number and the cargo quantity.
- ✓ Updated Checklists - Violations by Mode of Transport and ADR Exemptions.
- ✓ For each type of controlled cargo, a predetermined list of controls - violations is produced (tanks, bulk cargo, packaged goods, excluded quantities, etc.).
- ✓ Entry of details of the Advisor for the Safe Transport of Dangerous Goods (SAMEE) in case of detection of violations.
- ✓ Export Report of the results of each Control with the points of violations and the imposed fines.
- ✓ Keeping historical background of results of ADR inspections per Vehicle, Transport company and Auditor.

16. Conclusion

The transport of dangerous goods is, from a legislative and technical point of view, a complex process, difficult to implement by businesses both in the European Union and in Greece. From the classification and categorization of hazardous materials to the stringent protocols governing loading, packaging, and marking, it is evident that a comprehensive understanding and adherence to regulatory mandates are essential for mitigating risks and fostering a culture of safety within the transportation industry.It is a fact that dangerous goods are an important part of road transport, so it is incumbent upon all stakeholders , from regulatory bodies to industrial managers and transportation professionals , to prioritize safety, sustainability, and regulatory compliance in their operations. By embracing a proactive approach to risk management, investing in ongoing education and training, and leveraging technological innovations, it is possible collectively to mitigate the inherent hazards associated with the transportation of dangerous goods and uphold the highest standards of safety and environmental stewardship. Initiatives such as the Proteas ADR Control online tool serve as exemplars of how technological advancements can augment the capabilities of competent authorities in monitoring and enforcing compliance with hazardous materials transportation regulations.

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APPENDIX I

Inspections List Form

1. Place of control .....2. Date ..... 3. Time .....

4. State license plate and vehicle registration number .....

5. State license plate and trailer/semi-trailer registration number .....

6. Transport company / address .....

7. Safe Transport of Dangerous Goods Consultant /phone .....

8. Driver / passenger .....

9. Sender, address, place of loading (1) (2) .....

10 Consignee, address, place of unloading (1) (2) .....

(1) To be completed only if it concerns an infringement

(2) For grouped transfers, it is declared in the "remarks" section

11. Mode of transport ☐ bulk ☐ package ☐ tank

12. Transfer under regime ☐ 1.1.3.6. ☐ LQ ☐ EQ ☐ no

13. Total quantity of dangerous goods per transport unit .....

14. Transfer document ☐ checked ☐ no object

Violation detected:

☐ Absence of a document listing the transported dangerous goods

☐ Significant deficiencies in the transport document (consignor-consignee, quantities)

☐ Lack of additional or special information required for certain classes

☐ Document non-compliance with requirements (incorrect order of information/ language)

15. Written instructions ☐ checked ☐ not relevant

Violation detected:

☐ Absence of written instructions in the driver's language from the vehicle

☐ Non-compliance of written instructions with requirements (form / access)

16. Competent authority approval-permit ☐ checked ☐ not relevant

Violation detected:

☐ Absence of competent authority approval required for certain substances

17. ADR vehicle approval certificate ☐ checked ☐ not applicable

Violation detected:

☐ The vehicle does not have an appropriate valid certificate of approval

☐ The vehicle has a valid certificate but it is not on it

☐ Vehicle no longer meeting approval standards and representing an immediate risk

☐ Vehicle no longer meeting approval standards and which does not represent an immediate risk

18. Professional driver training certificate ☐ checked ☐ not relevant

Violation detected:

☐ Driver does not hold an appropriate valid certificate

☐ Driver does not have his license on the vehicle

19. Approved goods/mode of transport ☐ checked ☐ not applicable

Violation detected:

☐ Unauthorized transportation of dangerous goods

☐ Non-compliance with packaging instructions

☐ Transport in bulk not permitted

☐ Transfer to tank not allowed

☐ The transport unit includes more than one trailer / semi-trailer

20. Loading, cargo securing and handling ☐ checked ☐ not applicable

Violation detected:

☐ Non-observance of the rules governing the mixed loading of parcels

☐ Non-observance of special precautions for food, other consumables and animal feed

☐ Non-observance of the restrictions on the maximum quantities of certain goods per transport unit

☐ Non-observance of the rules for securing and stacking the load

☐ Non-observance of the smoking ban

☐ Use of fire or unprotected light source

☐ The vehicle is not subject to normal surveillance or has not been properly parked

21. Leakage of goods or wear of collars / restraints ☐ checked ☐ not applicable

Violation detected:

☐ Leakage of dangerous substances

☐ Transport with damaged inner or outer packaging

☐ Transporting bulk cargo with a container that is not structurally functional

☐ Transportation of packaged goods with a container that is not structurally functional

☐ Tank has not been closed properly

22. Packaging / package markings ☐ checked ☐ not relevant

Violation detected:

☐ Lack of marking with UN number and additional information where required

☐ Missing hazard label

☐ Non-UN approved packaging

☐ Non-compliance of markings with specifications (regarding dimensions, durability, etc.)

☐ Lack of prescribed postmarking for LQ/EQ transport

23. Superstructure / vehicle markings ☐ checked ☐ not applicable

Violation detected:

☐Lack of orange signs

☐Complete absence of danger signs (diamond)

☐Tank/Container-tank is not marked with details of construction, controls, etc.

☐Absence of LQ vehicle plates

☐ Absence of substance signal at elevated temperature

☐Absence of environmentally hazardous substance signal

☐Non-compliance of markings with specifications / incorrect placement

24. Equipment ☐ checked ☐ no object

Violation detected:

☐ Lack of general safety equipment (motion suspension wedge, warning signs, liquid eye wash, reflective hazard warning vest, portable lighting device, pair of protective gloves, eye protection)

☐ Lack of additional equipment required for certain classes (escape mask, shovel, drain cover material, collection container)

☐ Lack of fire extinguishers / Non-compliance of fire extinguishers with the requirements

25. More serious risk category ☐ Category1(ISP) ☐ Cat.11(PSP) ☐ Cat. 111 (SP)

any violations found

26.Observations

……

……

……

27.Competent authority/ official who carried out the control ……

APPENDIX II

LIST OF INSPECTIONS - VIOLATIONS FOR PACKAGED GOODS
(Point 17 is not a checkpoint for packaged goods and is automatically marked on the checklist as "not applicable").

	Infringements	Relevant ADR Paragraphs		Risk Category	Explanation
	Transport/ accompanying document(s)				
14	Check 1 . No transport document containing information for each dangerous substance, material or article that is carried	8.1.2.1 (a)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit: (a) The transport documents prescribed in 5.4.1, covering all the dangerous goods carried	1	No indication of any sort of the presence of dangerous goods. No transport document or transport document, the information of which does not correspond to the dangerous goods carried. Note: Infringement of Risk Category I is noted when the information in the transport document is so lacking that the inspector is unable to identify what is being carried in the cargo transport unit, in what quantities and which is the information concerning the consignor and the consignee.
	Check 2. Significant lacks in the transport document (name of consignor-consignee, quantities, etc.)	5.4.1.1.1		2	Inappropriate details of the nature and quantity of the dangerous goods carried. There is no information regarding the consignor and the consignee (name and address).
	Check 3. Lack of additional or special information required for certain classes	5.4.1.2		3	See for additional or special information required to be included in the transport document for classes 2, 4.1, 5.2 and 6.2 in 5.4.1.2 of ADR.
	Check 4 Non compliance of the transport document with the requirements (concerning incorrect order of information/ language)	5.4.1.1.1		3	
		5.4.1.4			
	Instructions in Writing				
15	Check 1 . No “Instructions in Writing” in driver’s language	5.4.3		2	Instructions in writing constitute an aid for the driver during an accident emergency situation that may occur or arise during carriage. Instructions in Writing shall be provided to the vehicle crew in language(s) that each member can read and understand.
		8.1.2.1(b)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit:(b) The instructions in writing prescribed in 5.4.3		

	Check 2 Inadequate “Instructions in Writing” (ADR format/ access point)	5.4.3.1	As an aid during an accident emergency situation that may occur or arise during carriage, instructions in writing in the form specified in 5.4.3.4 shall be carried in the vehicle crew’s cab and shall be readily available.	3	Instructions in Writing correspond to the four page model specified in 5.4.3.4 of ADR as regards its form and contents. The text and the symbols shall be legible, whereas the four pages can be reproduced on two sides of A4 . A company or other logo in the Instructions in Writing is acceptable. Instructions in Writing shall be carried in the vehicle crew’s cab and shall be readily available by the driver.
		5.4.3.2	These instructions shall be provided by the carrier to the vehicle crew in language(s) that each member can read and understand before the commencement of the journey. The carrier shall ensure that each member of the vehicle crew concerned understands and is capable of carrying out the instructions properly.		
		5.4.3.4			
16	**Approval - permission of competent authority**				
	Check 1 . No competent authority approval attached to the transport document when required for certain substances	5.4.1.2.3.3	Additional or special information required for certain classes When organic peroxides and self-reactive substances are carried under conditions where approval is required (for organic peroxides see 2.2.52.1.8, 4.1.7.2.2 and special provision TA2 of 6.8.4; for self-reactive substances see 2.2.41.1.13 and 4.1.7.2.2, a statement to his effect shall be included in the transport document, e.g. "Carriage in accordance with 2.2.52.1.8".	1	This check concerns ONLY classes 4.1 & 5.2.
		8.1.2.2(c)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(c) A copy of the competent authority approval, when required in		

			5.4.1.2.1 (c) or (d) or 5.4.1.2.3.3.		
18	**Driver's training certificate**				
	Check 1 . Driver with no proper and valid certificate	8.2		1	Driver's training certificate shall be valid and appropriate for the dangerous goods carried and the transport mode.
	Check 2 . Driver's ADR training certificate not carried on vehicle	8.1.2.2(b)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(b) The driver's training certificate prescribed in 8.2.1	3	It may be possible to establish whether the driver has been issued with a Training certificate. Connection with the database of the PROTEAS ADR CONTROL tool or check through phone call to the Department of Informatics of the Ministry of Infrastructure, Transport and Networks or the transport operation to be informed of the failure to carry the certificate and send it.
19	**Goods authorized for transport/ Authorized transportation mode**				
	Check 1 . Transporting dangerous goods that are prohibited for transport	2.2.X.2		1	
	Check 2 . Carriage of dangerous goods in bulk is prohibited	7.3.1		1	Bulk solids shall be loaded and evenly distributed in a manner that minimizes movement that could result in damage to the bulk container, container or vehicle or leakage of the dangerous goods. Check whether alphanumeric code(s) in column (10) and column (17) of Table A in Chapter 3.2 is/are noted.
		7.3.2			
		7.3.3			
20	**Loading, cargo securing and handling**				
	Check 1 . Non compliance with the limitations of the quantities of specific goods that can be carried per transport unit	7.5.5		2	Check of Part 7.5.5 of ADR and of Column 18 of Table A of Chapter 3.2, if a limitation of the quantity of specific goods that can be carried per transport unit is required. For tanks, this check concerns ONLY portable tanks.

	Check 2 .Non compliance with the rules concerning cargo securing and stowage	7.5.7		1	Before a bulk container, container or vehicle is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities. Structurally serviceable means the bulk container, container or vehicle does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a bulk container or container. Major defects include: (a) Bends, cracks or breaks in the structural or supporting members that affect the integrity of the bulk container, container or of the body of the vehicle; (b) More than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers; (c) More than two splices in any one top or bottom side rail; (d) Any splice in a door sill or corner post; (e) Door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative; (f) Gaskets and seals that do not seal; (g) Any distortion of the overall configuration of a bulk container or container great enough to prevent proper alignment of handling equipment, mounting and securing on a chassis or vehicle; (h) Any damage to lifting attachments or handling equipment interface features; or (i) Any damage to service or operational equipment. The provisions of 7.5.7.1 also apply to the loading, stowage and unloading of containers, tank-containers, portable tanks and MEGCs on to and from vehicles.
	Check 3 . Non compliance with prohibition of smoking	7.5.9	Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers. This prohibition of smoking is also applicable to the use of electronic	3	PROHIBITION OF SMOKING FOR ALL VEHICLES AND DANGEROUS GOODS. Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers.

			cigarettes and similar devices.		
		8.3.5	Smoking shall be prohibited during handling operations in the vicinity of vehicles and inside the vehicles. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.		
21	**Leakage of dangerous goods or damage to packages or means of retaining**				
	Check 1 . Leakage of dangerous goods			1	Leakage of dangerous goods: leakage that presents high danger of death, injury or environmental pollution for the public and cannot be easily dealt with or serious leakage that cannot be immediately dealt with by the driver. In this case the emergency services shall be informed and/or the vehicle shall be moved to a safe place if that is reasonable in the circumstances.
	Check 2 . Carriage of dangerous goods in container that is not structurally serviceable	7.1.4		2	Carriage in containers: Containers free from major defects in their structural components, e.g. big dents or bends, cracks or breaks in structural members, improper splices, door hinges and hardware that are inoperative, etc. Carriage in bulk using bulk containers: Bulk containers, containers or bodies of vehicles shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
22	**Marking of packagings/ packages**				
	Check 1 .No markings with UN Number and additional data when required	5.2.1		1	Check of the UN No Markings. The UN No Markings shall correspond to the dangerous goods contained. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
	Check 2 . No labelling of packages	5.2.2		2	Check of the danger labels of packages. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).

	Check 3 . Non-approved UN packaging	Part 6		3	Check whether packagings marked with the United Nations packaging symbol.
	Check 4 . Markings and labelling of packages provided but not fully compliant with ADR requirements (concerning dimensions, visibility and durability)	5.2.1		3	
		5.2.2			
23	**Placarding and marking of superstructure/ vehicle**				
	Check 1 .No orange-coloured plates in the transport unit	5.3.2		1	
	Check 2 . No placards provided	5.3.1		1	Check of placarding of containers and vehicles carrying dangerous goods. Check of placards in accordance with Column 5 of Table A of Chapter 3.2 ADR.
	Check 3 . Lack in the number of orange-coloured plates or placards (fewer orange-coloured plates or placards than required)	5.3.1.1 - 5.3.1.6		3	
	Check 4 . Tank/ tank container does not bear a marking with construction data, inspection data, etc.)	6.10		2	Part 6 6.8 / 6.10 / 6.12
		6.12			
		6.8			
	Check 5 . Non compliant placards with specifications / incorrect positioning	5.3.1.1 - 5.3.1.6		3	
		5.3.1.7			
	Check 6 . Non compliant orange-coloured plates with specifications / incorrect positioning	5.3.2		3	Check of specifications for the orange-coloured plates in accordance with 5.3.2.
24	**Equipment for personal and general protection on board**				

	Check 1 .No wheel chock	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 2 .No warning signs	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 3 .No eye rinsing liquid	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Not required for danger label numbers 2.1, 2.2. and 2.3 - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS CARRYING DANGEROUS GOODS IN ALL HAZARD CLASSES EXCEPT FOR CLASS 2.
		8.1.5.2			

	Check 4 . No warning vest	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Warning vest is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 5. No portable lighting apparatus	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Portable lighting apparatus is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 6 . No pair of protective gloves	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	A pair of protective gloves is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS
		8.1.5.2			

	Check 7. No eye protection	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Eye protection is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
25	**Additional equipment required for certain classess (dependent on load)**				
	Check 1 .No emergency escape mask	8.1.5.3		3	An emergency escape mask for each memeber of the vehicle crew shall be carried on board the vehicle for danger label numbers (hazard classes) 2.3 or 6.1. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 2 . No shovel	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 3 . No drain seal	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 4 . No collecting container	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
26	**Fire extinguisher(s)**				
	Check 1 .Lack of fire extinguishers/ Fire extinguishers not in compliance with the requirements of ADR	8.1.4.1-8.1.4.4		2	Vehicles carrying dangerous goods shall be equipped with portable fire extinguishers according to the transport unit maximum permissible mass of the vehicles. Portable fire extinguishers shall comply with the relevant requirements, be operational and bear a mark of compliance with a standard recognized by a competent authority and a marking indicating the date of the next inspection or of the maximum permissible period of use, as applicable (the date of the next inspection shall not have expired).

	Check 2 . Incorrect installation of fire extinguishers (access to the vehicle crew, protection against of the weather).	8.1.4.5	The fire extinguishers shall be installed on the transport units in a way that they are easily accessible to the vehicle crew. The installation shall be carried out in such a way that the fire extinguishers shall be protected against effects of the weather so that their operational safety is not affected. During carriage, the date required in 8.1.4.4 shall not have expired.	3	One (1) fire extinguisher shall be installed in the vehicle cab and one (1) outside the cab near the cargo. The fire extinguishers shall be protected against effects of the weather.

Table 31. List of inspections - violations for packaged goods

LIST OF CHECKS - VIOLATIONS FOR PACKAGED GOODS FALLING UNDER EXCEPTION 1.1.3. 6

(Point 15,17,18,24,25 is not a checkpoint for packaged goods falling under exception 1.1.3. 6 is automatically marked on the checklist as "not applicable").

	Infringements	**Relevant ADR Paragraphs**		**Risk Category**	**Explanation**
14	**Transport/ accompanying document(s)**				
	Check 1 . No transport document containing information for each dangerous substance, material or article that is carried	8.1.2.1 (a)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit: (a) The transport documents prescribed in 5.4.1, covering all the dangerous goods carried	1	No indication of any sort of the presence of dangerous goods. No transport document or transport document, the information of which does not correspond to the dangerous goods carried. Note: Infringement of Risk Category I is noted when the information in the transport document is so lacking that the inspector is unable to identify what is being carried in the cargo transport unit, in what quantities and which is the information concerning the consignor and the consignee.
	Check 2 . Significant lacks in the transport document (name of consignor-consignee, quantities, etc.)	5.4.1.1.1		2	Inappropriate details of the nature and quantity of the dangerous goods carried. There is no information regarding the consignor and the consignee (name and address).

	Check 3 . Lack of additional or special information required for certain classes	5.4.1.2		3	See for additional or special information required to be included in the transport document for classes 2, 4.1, 5.2 and 6.2 in 5.4.1.2 of ADR.
	Check 4 .Non compliance of the transport document with the requirements (concerning incorrect order of information/ language)	5.4.1.1.1		3	
		5.4.1.4			
	Approval - permission of competent authority				
16	Check 1 . No competent authority approval attached to the transport document when required for certain substances	5.4.1.2.3.3	Additional or special information required for certain classes When organic peroxides and self-reactive substances are carried under conditions where approval is required (for organic peroxides see 2.2.52.1.8, 4.1.7.2.2 and special provision TA2 of 6.8.4; for self-reactive substances see 2.2.41.1.13 and 4.1.7.2.2, a statement to his effect shall be included in the transport document, e.g. "Carriage in accordance with 2.2.52.1.8".	1	This check concerns ONLY classes 4.1 & 5.2.
		8.1.2.2(c)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(c) A copy of the competent authority		

			approval, when required in 5.4.1.2.1 (c) or (d) or 5.4.1.2.3.3.		
	Goods authorized for transport/ Authorized transportation mode				
19	Check 1 . Transporting dangerous goods that are prohibited for transport	2.2.X.2		1	
	Check 2 . Carriage of dangerous goods in bulk is prohibited	7.3.1		1	Bulk solids shall be loaded and evenly distributed in a manner that minimizes movement that could result in damage to the bulk container, container or vehicle or leakage of the dangerous goods. Check whether alphanumeric code(s) in column (10) and column (17) of Table A in Chapter 3.2 is/are noted.
		7.3.2			
		7.3.3			
	Loading, cargo securing and handling				
20	Check 1 . Non compliance with the limitations of the quantities of specific goods that can be carried per transport unit	7.5.5		2	Check of Part 7.5.5 of ADR and of Column 18 of Table A of Chapter 3.2, if a limitation of the quantity of specific goods that can be carried per transport unit is required. For tanks, this check concerns ONLY portable tanks.

	Check 2 .Non compliance with the rules concerning cargo securing and stowage	7.5.7		1	Before a bulk container, container or vehicle is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities. Structurally serviceable means the bulk container, container or vehicle does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a bulk container or container. Major defects include: (a) Bends, cracks or breaks in the structural or supporting members that affect the integrity of the bulk container, container or of the body of the vehicle; (b) More than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers; (c) More than two splices in any one top or bottom side rail; (d) Any splice in a door sill or corner post; (e) Door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative; (f) Gaskets and seals that do not seal; (g) Any distortion of the overall configuration of a bulk container or container great enough to prevent proper alignment of handling equipment, mounting and securing on a chassis or vehicle; (h) Any damage to lifting attachments or handling equipment interface features; or (i) Any damage to service or operational equipment. The provisions of 7.5.7.1 also apply to the loading, stowage and unloading of containers, tank-containers, portable tanks and MEGCs on to and from vehicles.
	Check 3 . Non compliance with prohibition of smoking	7.5.9	Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.	3	PROHIBITION OF SMOKING FOR ALL VEHICLES AND DANGEROUS GOODS. Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers.

		8.3.5	Smoking shall be prohibited during handling operations in the vicinity of vehicles and inside the vehicles. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.		
21	**Leakage of dangerous goods or damage to packages or means of retaining**				
	Check 1 . Leakage of dangerous goods			1	Leakage of dangerous goods: leakage that presents high danger of death, injury or environmental pollution for the public and cannot be easily dealt with or serious leakage that cannot be immediately dealt with by the driver. In this case the emergency services shall be informed and/or the vehicle shall be moved to a safe place if that is reasonable in the circumstances.
	Check 2 . Carriage of dangerous goods in container that is not structurally serviceable	7.1.4		2	Carriage in containers: Containers free from major defects in their structural components, e.g. big dents or bends, cracks or breaks in structural members, improper splices, door hinges and hardware that are inoperative, etc. Carriage in bulk using bulk containers: Bulk containers, containers or bodies of vehicles shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
22	**Marking of packagings/ packages**				
	Check 1 .No markings with UN Number and additional data when required	5.2.1		1	Check of the UN No Markings. The UN No Markings shall correspond to the dangerous goods contained. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
	Check 2 . No labelling of packages	5.2.2		2	Check of the danger labels of packages. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
	Check 3 . Non-approved UN packaging	Part 6		3	Check whether packagings marked with the United Nations packaging symbol.

	Check 4 . Markings and labelling of packages provided but not fully compliant with ADR requirements (concerning dimensions, visibility and durability)	5.2.1		3	
		5.2.2			
23	**Placarding and marking of superstructure/ vehicle**				
	Check 1 .No orange-coloured plates in the transport unit	5.3.2		1	
	Check 2 . No placards provided	5.3.1		1	Check of placarding of containers and vehicles carrying dangerous goods. Check of placards in accordance with Column 5 of Table A of Chapter 3.2 ADR.
	Check 3 . Lack in the number of orange-coloured plates or placards (fewer orange-coloured plates or placards than required)	5.3.1.1 - 5.3.1.6		3	
	Check 4 . Tank/ tank container does not bear a marking with construction data, inspection data, etc.)	6.10		2	Part 6 6.8 / 6.10 / 6.12
		6.12			
		6.8			
	Check 5 . Non compliant placards with specifications / incorrect positioning	5.3.1.1 - 5.3.1.6		3	
		5.3.1.7			
	Check 6 . Non compliant orange-coloured plates with specifications / incorrect positioning	5.3.2		3	Check of specifications for the orange-coloured plates in accordance with 5.3.2.
26	**Fire extinguisher(s)**				

	Check 1 .Lack of fire extinguishers/ Fire extinguishers not in compliance with the requirements of ADR	8.1.4.1-8.1.4.4		2	Vehicles carrying dangerous goods shall be equipped with portable fire extinguishers according to the transport unit maximum permissible mass of the vehicles. Portable fire extinguishers shall comply with the relevant requirements, be operational and bear a mark of compliance with a standard recognized by a competent authority and a marking indicating the date of the next inspection or of the maximum permissible period of use, as applicable (the date of the next inspection shall not have expired).
	Check 2 . Incorrect installation of fire extinguishers (access to the vehicle crew, protection against of the weather).	8.1.4.5	The fire extinguishers shall be installed on the transport units in a way that they are easily accessible to the vehicle crew. The installation shall be carried out in such a way that the fire extinguishers shall be protected against effects of the weather so that their operational safety is not affected. During carriage, the date required in 8.1.4.4 shall not have expired.	3	One (1) fire extinguisher shall be installed in the vehicle cab and one (1) outside the cab near the cargo. The fire extinguishers shall be protected against effects of the weather.

Table 32. List of inspections - violations for packaged goods falling under exception 1.1.3. 6

LIST OF CHECKS - VIOLATIONS FOR PACKAGED IN LIMITED QUANTITIES LQ (Point 14, 15, 16, 17, 18, 24, 25, 26 is not a checkpoint for LQ)					
	Infringements	**Relevant ADR Paragraphs**		**Risk Category**	**Explanation**
	Goods authorized for transport/ Authorized transportation mode				
	Check 1 . Transporting dangerous goods that are prohibited for transport	2.2.X.2		1	
19	Check 2 . Carriage of dangerous goods in bulk is prohibited	7.3.1		1	Bulk solids shall be loaded and evenly distributed in a manner that minimizes movement that could result in damage to the bulk container, container or vehicle or leakage of the dangerous goods. Check whether alphanumeric code(s) in column (10) and column (17) of Table A in Chapter 3.2 is/are noted.
		7.3.2			
		7.3.3			
	Loading, cargo securing and handling				
	Check 1 . Non compliance with the limitations of the quantities of specific goods that can be carried per transport unit	7.5.5		2	Check of Part 7.5.5 of ADR and of Column 18 of Table A of Chapter 3.2, if a limitation of the quantity of specific goods that can be carried per transport unit is required. For tanks, this check concerns ONLY portable tanks.
20	Check 2 .Non compliance with the rules concerning cargo securing and stowage	7.5.7		1	Before a bulk container, container or vehicle is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities. Structurally serviceable means the bulk container, container or vehicle does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a bulk container or container. Major defects include: (a) Bends, cracks or breaks in the structural or supporting members that affect the integrity of the bulk container, container or of the body of the vehicle; (b) More than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers; (c) More than two splices in any one top or bottom side rail; (d) Any splice in a door sill or corner post; (e) Door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative; (f) Gaskets and seals that do not seal;

					(g) Any distortion of the overall configuration of a bulk container or container great enough to prevent proper alignment of handling equipment, mounting and securing on a chassis or vehicle; (h) Any damage to lifting attachments or handling equipment interface features; or (i) Any damage to service or operational equipment. The provisions of 7.5.7.1 also apply to the loading, stowage and unloading of containers, tank-containers, portable tanks and MEGCs on to and from vehicles.
	Check 3 . Non compliance with prohibition of smoking	7.5.9	Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.	3	PROHIBITION OF SMOKING FOR ALL VEHICLES AND DANGEROUS GOODS. Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers.
		8.3.5	Smoking shall be prohibited during handling operations in the vicinity of vehicles and inside the vehicles. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.		
	Leakage of dangerous goods or damage to packages or means of retaining				
21	Check 1 . Leakage of dangerous goods			1	Leakage of dangerous goods: leakage that presents high danger of death, injury or environmental pollution for the public and cannot be easily dealt with or serious leakage that cannot be immediately dealt with by the driver. In this case the emergency services shall be informed and/or the vehicle shall be moved to a safe place if that is reasonable in the circumstances.

	Check 2 . Carriage of dangerous goods in container that is not structurally serviceable	7.1.4		2	Carriage in containers: Containers free from major defects in their structural components, e.g. big dents or bends, cracks in structural members, improper splices, door hinges and hardware that are inoperative, etc. Carriage in bulk using bulk containers: Bulk containers, containers or bodies of vehicles shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
22	**Marking of packagings/ packages**				
	Check 1 .No markings with UN Number and additional data when required	5.2.1		1	Check of the UN No Markings. The UN No Markings shall correspond to the dangerous goods contained. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
	Check 2 . No labelling of packages	5.2.2		2	Check of the danger labels of packages. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
	Check 3 . Non-approved UN packaging	Part 6		3	Check whether packagings marked with the United Nations packaging symbol.
	Check 4 . Markings and labelling of packages provided but not fully compliant with ADR requirements (concerning dimensions, visibility and durability)	5.2.1		3	
		5.2.2			
23	**Placarding and marking of superstructure/ vehicle**				
	Check 1 .No orange-coloured plates in the transport unit	5.3.2		1	
	Check 2 . No placards provided	5.3.1		1	Check of placarding of containers and vehicles carrying dangerous goods. Check of placards in accordance with Column 5 of Table A of Chapter 3.2 ADR.
	Check 3 . Lack in the number of orange-coloured plates or placards (fewer orange-coloured plates or placards than required)	5.3.1.1 - 5.3.1.6		3	
	Check 4 . Tank/ tank container	6.10		2	

	does not bear a marking with construction data, inspection data, etc.)	6.12			Part 6 6.8 / 6.10 / 6.12
		6.8			
	Check 5 . Non compliant placards with specifications / incorrect positioning	5.3.1.1 - 5.3.1.6		3	
		5.3.1.7			
	Check 6 . Non compliant orange-coloured plates with specifications / incorrect positioning	5.3.2		3	Check of specifications for the orange-coloured plates in accordance with 5.3.2.

Table 33. List of inspections - violations for packaged in limited quantities LQ

LIST OF CHECKS - VIOLATIONS FOR PACKAGED IN EXCLUDED QUANTITIES EQ (Point 14, 15, 16, 17, 18, 20, 23-26 is not a checkpoint for EQ)					
	Infringements	**Relevant ADR Paragraphs**		**Risk Category**	**Explanation**
	Goods authorized for transport/ Authorized transportation mode				
	Check 1 . Transporting dangerous goods that are prohibited for transport	2.2.X.2		1	
19	Check 2 . Carriage of dangerous goods in bulk is prohibited	7.3.1		1	Bulk solids shall be loaded and evenly distributed in a manner that minimizes movement that could result in damage to the bulk container, container or vehicle or leakage of the dangerous goods. Check whether alphanumeric code(s) in column (10) and column (17) of Table A in Chapter 3.2 is/are noted.
		7.3.2			
		7.3.3			
	Leakage of dangerous goods or damage to packages or means of retaining				
21	Check 1 . Leakage of dangerous goods			1	Leakage of dangerous goods: leakage that presents high danger of death, injury or environmental pollution for the public and cannot be easily dealt with or serious leakage that cannot be immediately dealt with by the driver. In this case the emergency services shall be informed and/or the vehicle shall be moved to a safe place if that is reasonable in the circumstances.

	Check 2 . Carriage of dangerous goods in container that is not structurally serviceable	7.1.4		2	Carriage in containers: Containers free from major defects in their structural components, e.g. big dents or bends, cracks or breaks in structural members, improper splices, door hinges and hardware that are inoperative, etc. Carriage in bulk using bulk containers: Bulk containers, containers or bodies of vehicles shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
	Marking of packagings/ packages				
	Check 1 .No markings with UN Number and additional data when required	5.2.1		1	Check of the UN No Markings. The UN No Markings shall correspond to the dangerous goods contained. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
	Check 2 . No labelling of packages	5.2.2		2	Check of the danger labels of packages. Packages containing environmentally hazardous substances shall be marked with the environmentally hazardous sustance mark (5.2.1.8.3 of ADR).
22	Check 3 . Non-approved UN packaging	Part 6		3	Check whether packagings marked with the United Nations packaging symbol.
	Check 4 . Markings and labelling of packages provided but not fully compliant with ADR requirements (concerning dimensions, visibility and durability)	5.2.1		3	
		5.2.2			

Table 34. List of inspections - violations for packaged in excluded quantities EQ

CHECK LIST - VIOLATIONS FOR BULK CARGO (Point 22 is not a checkpoint for bulk cargo)					
	Infringements	**Relevant ADR Paragraphs**		**Risk Category**	**Explanation**
14	**Transport/ accompanying document(s)**				
	Check 1 . No transport document containing information for each dangerous substance, material or article that is carried	8.1.2.1 (a)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit: (a) The transport documents prescribed in 5.4.1, covering all the dangerous goods carried	1	No indication of any sort of the presence of dangerous goods. No transport document or transport document, the information of which does not correspond to the dangerous goods carried. Note: Infringement of Risk Category I is noted when the information in the transport document is so lacking that the inspector is unable to identify what is being carried in the cargo transport unit, in what quantities and which is the information concerning the consignor and the consignee.
	Check 2 . Significant lacks in the transport document (name of consignor-consignee, quantities, etc.)	5.4.1.1.1		2	Inappropriate details of the nature and quantity of the dangerous goods carried. There is no information regarding the consignor and the consignee (name and address).
	Check 3 . Lack of additional or special information required for certain classes	5.4.1.2		3	See for additional or special information required to be included in the transport document for classes 2, 4.1, 5.2 and 6.2 in 5.4.1.2 of ADR.
	Check 4 .Non compliance of the transport document with the requirements (concerning incorrect order of information/ language)	5.4.1.1.1		3	
		5.4.1.4			
15	**Instructions in Writing**				
	Check 1 . No “Instructions in Writing” in driver’s language	5.4.3		2	Instructions in writing constitute an aid for the driver during an accident emergency situation that may occur or arise during carriage. Instructions in Writing shall be provided to the vehicle crew in language(s) that each member can read and understand.
		8.1.2.1(b)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit:(b) The instructions in writing prescribed in 5.4.3		

	Check 2 . Inadequate “Instructions in Writing” (ADR format/ access point)	5.4.3.1	As an aid during an accident emergency situation that may occur or arise during carriage, instructions in writing in the form specified in 5.4.3.4 shall be carried in the vehicle crew’s cab and shall be readily available.	3	Instructions in Writing correspond to the four page model specified in 5.4.3.4 of ADR as regards its form and contents. The text and the symbols shall be legible, whereas the four pages can be reproduced on two sides of A4 . A company or other logo in the Instructions in Writing is acceptable. Instructions in Writing shall be carried in the vehicle crew’s cab and shall be readily available by the driver.
		5.4.3.2	These instructions shall be provided by the carrier to the vehicle crew in language(s) that each member can read and understand before the commencement of the journey. The carrier shall ensure that each member of the vehicle crew concerned understands and is capable of carrying out the instructions properly.		
		5.4.3.4			
16	**Competent authority approval - permission**				
	Check 1 . No competent authority approval attached to the transport document when required for certain substances	5.4.1.2.3.3	Additional or special information required for certain classes When organic peroxides and self-reactive substances are carried under conditions where approval is required (for organic peroxides see 2.2.52.1.8, 4.1.7.2.2 and special provision TA2 of 6.8.4; for self-reactive	1	This check concerns ONLY classes 4.1 & 5.2.

			substances see 2.2.41.1.13 and 4.1.7.2.2, a statement to his effect shall be included in the transport document, e.g. "Carriage in accordance with 2.2.52.1.8".		
		8.1.2.2(c)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(c) A copy of the competent authority approval, when required in 5.4.1.2.1 (c) or (d) or 5.4.1.2.3.3.		
	Certificate of ADR approval				
17	Check 1 . Unsuitable certificate of ADR approval	9.1.1.2		1	The conformity of the vehicle shall be certified by the issue of a certificate in accordance with 9.1.3. The certificate of approval shall be valid and proper for the dangerous goods carried.
		9.1.2.3	Annual technical inspection EX/II, EX/III, FL and AT vehicles and MEMUs shall be subject to an annual technical inspection in their country of registration to make sure that they conform to the relevant requirements of this Part, and to the general safety regulations (concerning brakes, lighting, etc.) in force in their country of registration. The conformity of the vehicle shall be certified either by the extension of		

			validity of the certificate of approval or by the issue of a new certificate of approval in accordance with 9.1.3.		
		9.1.3			
	Check 2 . Certificate of ADR approval not carried on the vehicle or a photocopy of a valid certificate is carried	8.1.2.2.(a)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit: (a) The certificate of approval referred to in 9.1.3 for each transport unit or element thereof	3	It may be possible to establish whether the vehicle has been issued with a certificate of approval. Connection with the database of the PROTEAS ADR CONTROL tool or check through phone call to the Department of Informatics of the Ministry of Infrastructure, Transport and Networks or the transport operation to send the certificate of approval.
18	**Driver's training certificate**				
	Check 1 . Driver with no proper and valid certificate	8.2		1	Driver's training certificate shall be valid and appropriate for the dangerous goods carried and the transport mode.
	Check 2 . Driver's ADR training certificate not carried on vehicle	8.1.2.2(b)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(b) The driver's training certificate prescribed in 8.2.1	3	It may be possible to establish whether the driver has been issued with a Training certificate. Connection with the database of the PROTEAS ADR CONTROL tool or check through phone call to the Department of Informatics of the Ministry of Infrastructure, Transport and Networks or the transport operation to be informed of the failure to carry the certificate and send it.
19	**Goods authorized for transport/ Authorized transportation mode**				
	Check 1 . Transporting dangerous goods that are prohibited for transport	2.2.X.2		1	
	Check 2 . Carriage of dangerous goods in bulk is prohibited	7.3.1		1	Bulk solids shall be loaded and evenly distributed in a manner that minimizes movement that could result in damage

		7.3.2			to the bulk container, container or vehicle or leakage of the dangerous goods. Check whether alphanumeric code(s) in column (10) and column (17) of Table A in Chapter 3.2 is/are noted.
		7.3.3			
	Loading, cargo securing and handling				
	Check 1 . Non compliance with the limitations of the quantities of specific goods that can be carried per transport unit	7.5.5		2	Check of Part 7.5.5 of ADR and of Column 18 of Table A of Chapter 3.2, if a limitation of the quantity of specific goods that can be carried per transport unit is required. For tanks, this check concerns ONLY portable tanks.
20	Check 2 .Non compliance with the rules concerning cargo securing and stowage	7.5.7		1	Before a bulk container, container or vehicle is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities. Structurally serviceable means the bulk container, container or vehicle does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a bulk container or container. Major defects include: (a) Bends, cracks or breaks in the structural or supporting members that affect the integrity of the bulk container, container or of the body of the vehicle; (b) More than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers; (c) More than two splices in any one top or bottom side rail; (d) Any splice in a door sill or corner post; (e) Door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative; (f) Gaskets and seals that do not seal; (g) Any distortion of the overall configuration of a bulk container or container great enough to prevent proper alignment of handling equipment, mounting and securing on a chassis or vehicle; (h) Any damage to lifting attachments or handling equipment interface features; or (i) Any damage to service or operational equipment. The provisions of 7.5.7.1 also apply to the loading, stowage and unloading of containers, tank-containers, portable

					tanks and MEGCs on to and from vehicles.
	Check 3 . Non compliance with prohibition of smoking	7.5.9	Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.	3	PROHIBITION OF SMOKING FOR ALL VEHICLES AND DANGEROUS GOODS. Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers.
		8.3.5	Smoking shall be prohibited during handling operations in the vicinity of vehicles and inside the vehicles. This prohibition of smoking is also applicable to the use of electronic		

			cigarettes and similar devices.		
21	**Leakage of dangerous goods or damage to packages or means of retaining**				
	Check 1 . Leakage of dangerous goods			1	Leakage of dangerous goods: leakage that presents high danger of death, injury or environmental pollution for the public and cannot be easily dealt with or serious leakage that cannot be immediately dealt with by the driver. In this case the emergency services shall be informed and/or the vehicle shall be moved to a safe place if that is reasonable in the circumstances.
	Check 2 . Carriage of dangerous goods in container that is not structurally serviceable	7.1.4		2	Carriage in containers: Containers free from major defects in their structural components, e.g. big dents or bends, cracks or breaks in structural members, improper splices, door hinges and hardware that are inoperative, etc. Carriage in bulk using bulk containers: Bulk containers, containers or bodies of vehicles shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
		5.2.2			
23	**Placarding and marking of superstructure/ vehicle**				
	Check 1 .No orange-coloured plates in the transport unit	5.3.2		1	
	Check 2 . No placards provided	5.3.1		1	Check of placarding of containers and vehicles carrying dangerous goods. Check of placards in accordance with Column 5 of Table A of Chapter 3.2 ADR.
	Check 3 . Lack in the number of orange-coloured plates or placards (fewer orange-coloured plates or placards than required)	5.3.1.1 - 5.3.1.6		3	
	Check 4 . Tank/ tank container does not bear a marking with construction data, inspection data, etc.)	6.10		2	Part 6 6.8 / 6.10 / 6.12
		6.12			
		6.8			
	Check 5 . Non compliant placards	5.3.1.1 - 5.3.1.6		3	

	with specifications / incorrect positioning	5.3.1.7			
	Check 6 . Non compliant orange-coloured plates with specifications / incorrect positioning	5.3.2		3	Check of specifications for the orange-coloured plates in accordance with 5.3.2.
24	**Equipment for personal and general protection on board**				
	Check 1 .No wheel chock	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 2 .No warning signs	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			

	Check 3 .No eye rinsing liquid	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Not required for danger label numbers 2.1, 2.2. and 2.3 - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS CARRYING DANGEROUS GOODS IN ALL HAZARD CLASSES EXCEPT FOR CLASS 2.
		8.1.5.2			
	Check 4 . No warning vest	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Warning vest is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 5. No portable lighting apparatus	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with	3	Portable lighting apparatus is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.

			8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.		
		8.1.5.2			
	Check 6 . No pair of protective gloves	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	A pair of protective gloves is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS
		8.1.5.2			
	Check 7. No eye protection	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the	3	Eye protection is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.

			transport document.		
		8.1.5.2			
	Additional equipment required for certain classess (dependent on load)				
25	Check 1 .No emergency escape mask	8.1.5.3		3	An emergency escape mask for each memeber of the vehicle crew shall be carried on board the vehicle for danger label numbers (hazard classes) 2.3 or 6.1. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 2 . No shovel	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 3 . No drain seal	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 4 . No collecting container	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
26	**Fire extinguisher(s)**				
	Check 1 .Lack of fire extinguishers/ Fire extinguishers not in compliance with the requirements of ADR	8.1.4.1-8.1.4.4		2	Vehicles carrying dangerous goods shall be equipped with portable fire extinguishers according to the transport unit maximum permissible mass of the vehicles. Portable fire extinguishers shall comply with the relevant requirements, be operational and bear a mark of compliance with a standard recognized by a competent authority and a marking indicating the date of the next inspection or of the maximum permissible period of use, as applicable (the date of the next inspection shall not have expired).
	Check 2 . Incorrect installation of fire extinguishers (access to the vehicle crew, protection against of the weather).	8.1.4.5	The fire extinguishers shall be installed on the transport units in a way that they are easily accessible to the vehicle crew. The installation shall be carried out in such a way that the fire extinguishers	3	One (1) fire extinguisher shall be installed in the vehicle cab and one (1) outside the cab near the cargo. The fire extinguishers shall be protected against effects of the weather.

			shall be protected against effects of the weather so that their operational safety is not affected. During carriage, the date required in 8.1.4.4 shall not have expired.		

Table 35. List of inspections - violations for bulk cargo

CHECK LIST - VIOLATIONS FOR TANKS (Point 22 is not a checkpoint for tanks)					
	Infringements	**Relevant ADR Paragraphs**		**Risk Category**	**Explanation**
14	**Transport/ accompanying document(s)**				
	Check 1 . No transport document containing information for each dangerous substance, material or article that is carried	8.1.2.1 (a)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit: (a) The transport documents prescribed in 5.4.1, covering all the dangerous goods carried	1	No indication of any sort of the presence of dangerous goods. No transport document or transport document, the information of which does not correspond to the dangerous goods carried. Note: Infringement of Risk Category I is noted when the information in the transport document is so lacking that the inspector is unable to identify what is being carried in the cargo transport unit, in what quantities and which is the information concerning the consignor and the consignee.
	Check 2 . Significant lacks in the transport document (name of consignor-consignee, quantities, etc.)	5.4.1.1.1		2	Inappropriate details of the nature and quantity of the dangerous goods carried. There is no information regarding the consignor and the consignee (name and address).
	Check 3 . Lack of additional or special information required for certain classes	5.4.1.2		3	See for additional or special information required to be included in the transport document for classes 2, 4.1, 5.2 and 6.2 in 5.4.1.2 of ADR.
	Check 4 .Non compliance of the transport document with the requirements (concerning incorrect order of information/ language)	5.4.1.1.1		3	
		5.4.1.4			

	Instructions in Writing				
	Check 1 . No “Instructions in Writing” in driver’s language	5.4.3		2	Instructions in writing constitute an aid for the driver during an accident emergency situation that may occur or arise during carriage. Instructions in Writing shall be provided to the vehicle crew in language(s) that each member can read and understand.
		8.1.2.1(b)	In addition to the documents required under other regulations, the following documents shall be carried on the transport unit:(b) The instructions in writing prescribed in 5.4.3		
15	Check 2 . Inadequate “Instructions in Writing” (ADR format/ access point)	5.4.3.1	As an aid during an accident emergency situation that may occur or arise during carriage, instructions in writing in the form specified in 5.4.3.4 shall be carried in the vehicle crew’s cab and shall be readily available.	3	Instructions in Writing correspond to the four page model specified in 5.4.3.4 of ADR as regards its form and contents. The text and the symbols shall be legible, whereas the four pages can be reproduced on two sides of A4 . A company or other logo in the Instructions in Writing is acceptable. Instructions in Writing shall be carried in the vehicle crew’s cab and shall be readily available by the driver.
		5.4.3.2	These instructions shall be provided by the carrier to the vehicle crew in language(s) that each member can read and understand before the commencement of the journey. The carrier shall ensure that each member of the vehicle crew concerned understands and is capable of carrying out the instructions properly.		
		5.4.3.4			

16	**Competent authority approval - permission**				
	Check 1 . No competent authority approval attached to the transport document when required for certain substances	5.4.1.2.3.3	Additional or special information required for certain classes When organic peroxides and self-reactive substances are carried under conditions where approval is required (for organic peroxides see 2.2.52.1.8, 4.1.7.2.2 and special provision TA2 of 6.8.4; for self-reactive substances see 2.2.41.1.13 and 4.1.7.2.2, a statement to his effect shall be included in the transport document, e.g. "Carriage in accordance with 2.2.52.1.8".	1	This check concerns ONLY classes 4.1 & 5.2.
		8.1.2.2(c)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(c) A copy of the competent authority approval, when required in 5.4.1.2.1 (c) or (d) or 5.4.1.2.3.3.		
17	**Certificate of ADR approval**				
		9.1.1.2		1	The conformity of the vehicle shall be certified by the issue of a certificate in

	Check 1 . Unsuitable certificate of ADR approval	9.1.2.3	Annual technical inspection EX/II, EX/III, FL and AT vehicles and MEMUs shall be subject to an annual technical inspection in their country of registration to make sure that they conform to the relevant requirements of this Part, and to the general safety regulations (concerning brakes, lighting, etc.) in force in their country of registration. The conformity of the vehicle shall be certified either by the extension of validity of the certificate of approval or by the issue of a new certificate of approval in accordance with 9.1.3.		accordance with 9.1.3. The certificate of approval shall be valid and proper for the dangerous goods carried.
		9.1.3			
	Check 2 . Certificate of ADR approval not carried on the vehicle or a photocopy of a valid certificate is carried	8.1.2.2.(a)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit: (a) The certificate of approval referred to in 9.1.3 for each transport unit or element thereof	3	It may be possible to establish whether the vehicle has been issued with a certificate of approval. Connection with the database of the PROTEAS ADR CONTROL tool or check through phone call to the Department of Informatics of the Ministry of Infrastructure, Transport and Networks or the transport operation to send the certificate of approval.
18	**Driver's training certificate**				
	Check 1 . Driver with no proper and valid certificate	8.2		1	Driver's training certificate shall be valid and appropriate for the dangerous goods carried and the transport mode.

	Check 2 . Driver's ADR training certificate not carried on vehicle	8.1.2.2(b)	Where the provisions of ADR require the following documents to be drawn up, they shall likewise be carried on the transport unit:(b) The driver's training certificate prescribed in 8.2.1	3	It may be possible to establish whether the driver has been issued with a Training certificate. Connection with the database of the PROTEAS ADR CONTROL tool or check through phone call to the Department of Informatics of the Ministry of Infrastructure, Transport and Networks or the transport operation to be informed of the failure to carry the certificate and send it.
	Goods authorized for transport/ Authorized transportation mode				
	Check 1 . Transporting dangerous goods that are prohibited for transport	2.2.X.2		1	
19	Check 2 . Carriage of dangerous goods in bulk is prohibited	7.3.1		1	Bulk solids shall be loaded and evenly distributed in a manner that minimizes movement that could result in damage to the bulk container, container or vehicle or leakage of the dangerous goods. Check whether alphanumeric code(s) in column (10) and column (17) of Table A in Chapter 3.2 is/are noted.
		7.3.2			
		7.3.3			
	Loading, cargo securing and handling				
20	Check 1 . Non compliance with the limitations of the quantities of specific goods that can be carried per transport unit	7.5.5		2	Check of Part 7.5.5 of ADR and of Column 18 of Table A of Chapter 3.2, if a limitation of the quantity of specific goods that can be carried per transport unit is required. For tanks, this check concerns ONLY portable tanks.

	Check 2 .Non compliance with the rules concerning cargo securing and stowage	7.5.7		1	Before a bulk container, container or vehicle is filled it shall be visually examined to ensure it is structurally serviceable, its interior walls, ceiling and floors are free from protrusions or damage and that any inner liners or substance retaining equipment are free from rips, tears or any damage that would compromise its cargo retention capabilities. Structurally serviceable means the bulk container, container or vehicle does not have major defects in its structural components, such as top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a bulk container or container. Major defects include: (a) Bends, cracks or breaks in the structural or supporting members that affect the integrity of the bulk container, container or of the body of the vehicle; (b) More than one splice or an improper splice (such as a lapped splice) in top or bottom end rails or door headers; (c) More than two splices in any one top or bottom side rail; (d) Any splice in a door sill or corner post; (e) Door hinges and hardware that are seized, twisted, broken, missing, or otherwise inoperative; (f) Gaskets and seals that do not seal; (g) Any distortion of the overall configuration of a bulk container or container great enough to prevent proper alignment of handling equipment, mounting and securing on a chassis or vehicle; (h) Any damage to lifting attachments or handling equipment interface features; or (i) Any damage to service or operational equipment. The provisions of 7.5.7.1 also apply to the loading, stowage and unloading of containers, tank-containers, portable tanks and MEGCs on to and from vehicles.
	Check 3 . Non compliance with prohibition of smoking	7.5.9	Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers. This prohibition of smoking is also applicable to the use of electronic	3	PROHIBITION OF SMOKING FOR ALL VEHICLES AND DANGEROUS GOODS. Smoking shall be prohibited during handling operations in the vicinity of vehicles or containers and inside the vehicles or containers.

			cigarettes and similar devices.		
		8.3.5	Smoking shall be prohibited during handling operations in the vicinity of vehicles and inside the vehicles. This prohibition of smoking is also applicable to the use of electronic cigarettes and similar devices.		
21	**Leakage of dangerous goods or damage to packages or means of retaining**				
	Check 1 . Leakage of dangerous goods			1	Leakage of dangerous goods: leakage that presents high danger of death, injury or environmental pollution for the public and cannot be easily dealt with or serious leakage that cannot be immediately dealt with by the driver. In this case the emergency services shall be informed and/or the vehicle shall be moved to a safe place if that is reasonable in the circumstances.
	Check 2 . Carriage of dangerous goods in container that is not structurally serviceable	7.1.4		2	Carriage in containers: Containers free from major defects in their structural components, e.g. big dents or bends, cracks or breaks in structural members, improper splices, door hinges and hardware that are inoperative, etc. Carriage in bulk using bulk containers: Bulk containers, containers or bodies of vehicles shall be siftproof and shall be so closed that none of the contents can escape under normal conditions of carriage including the effect of vibration, or by changes of temperature, humidity or pressure.
		5.2.2			
23	**Placarding and marking of superstructure/ vehicle**				
	Check 1 .No orange-coloured plates in the transport unit	5.3.2		1	
	Check 2 . No placards provided	5.3.1		1	Check of placarding of containers and vehicles carrying dangerous goods. Check of placards in accordance with Column 5 of Table A of Chapter 3.2 ADR.

	Check 3 . Lack in the number of orange-coloured plates or placards (fewer orange-coloured plates or placards than required)	5.3.1.1 - 5.3.1.6		3	
	Check 4 . Tank/ tank container does not bear a marking with construction data, inspection data, etc.)	6.10		2	Part 6 6.8 / 6.10 / 6.12
		6.12			
		6.8			
	Check 5 . Non compliant placards with specifications / incorrect positioning	5.3.1.1 - 5.3.1.6		3	
		5.3.1.7			
	Check 6 . Non compliant orange-coloured plates with specifications / incorrect positioning	5.3.2		3	Check of specifications for the orange-coloured plates in accordance with 5.3.2.
24	**Equipment for personal and general protection on board**				
	Check 1 .No wheel chock	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			

	Check 2 .No warning signs	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 3 .No eye rinsing liquid	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Not required for danger label numbers 2.1, 2.2. and 2.3 - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS CARRYING DANGEROUS GOODS IN ALL HAZARD CLASSES EXCEPT FOR CLASS 2.
		8.1.5.2			
	Check 4 . No warning vest	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with	3	Warning vest is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.

			8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.		
		8.1.5.2			
	Check 5. No portable lighting apparatus	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Portable lighting apparatus is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
	Check 6 . No pair of protective gloves	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the	3	A pair of protective gloves is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS

			transport document.		
		8.1.5.2			
	Check 7. No eye protection	8.1.5.1	Each transport unit carrying dangerous goods shall be provided with items of equipment for general and personal protection in accordance with 8.1.5.2. The items of equipment shall be selected in accordance with the danger label number of the goods loaded. The label numbers can be identified through the transport document.	3	Eye protection is required for each member of the vehicle crew - MANDATORY EQUIPMENT ON BOARD ALL TRANSPORT UNITS.
		8.1.5.2			
25	**Additional equipment required for certain classess (dependent on load)**				
	Check 1 .No emergency escape mask	8.1.5.3		3	An emergency escape mask for each memeber of the vehicle crew shall be carried on board the vehicle for danger label numbers (hazard classes) 2.3 or 6.1. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 2 . No shovel	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 3 . No drain seal	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
	Check 4 . No collecting container	8.1.5.3		3	Only required for SOLIDS and LIQUIDS and HAZARD CLASSES 3, 4.1, 4.3, 8 or 9. Check of Column 19 of Table A of Chapter 3.2 and Part 8.1.5.3.
26	**Fire extinguisher(s)**				

	Check 1 .Lack of fire extinguishers/ Fire extinguishers not in compliance with the requirements of ADR	8.1.4.1-8.1.4.4		2	Vehicles carrying dangerous goods shall be equipped with portable fire extinguishers according to the transport unit maximum permissible mass of the vehicles. Portable fire extinguishers shall comply with the relevant requirements, be operational and bear a mark of compliance with a standard recognized by a competent authority and a marking indicating the date of the next inspection or of the maximum permissible period of use, as applicable (the date of the next inspection shall not have expired).
	Check 2 . Incorrect installation of fire extinguishers (access to the vehicle crew, protection against of the weather).	8.1.4.5	The fire extinguishers shall be installed on the transport units in a way that they are easily accessible to the vehicle crew. The installation shall be carried out in such a way that the fire extinguishers shall be protected against effects of the weather so that their operational safety is not affected. During carriage, the date required in 8.1.4.4 shall not have expired.	3	One (1) fire extinguisher shall be installed in the vehicle cab and one (1) outside the cab near the cargo. The fire extinguishers shall be protected against effects of the weather.

Table 36. List of inspections - violations for tanks