



TECHNICAL GUIDE

ADR Guide: Vehicle & Driver Rules for Dangerous Goods Transport

Learn what ADR means for heavy trucks: hazard classes, required vehicle equipment, driver certification, orange plate labeling, and inspection documents.

A tanker truck is pulled over at a roadside checkpoint on an intercity highway in the middle of the night. The inspection team first checks the orange plate on the front bumper, then asks the driver for the transport documents and the small certificate in his wallet. Inside the cab, they check in sequence whether the fire extinguisher is in place, the wheel chock is accessible, and the written emergency instructions are on hand. A single missing item is enough to keep the vehicle held up for hours and trigger an administrative procedure. In dangerous goods transport the margin for error is small, because what is at stake is not just a missing document but the safety of people and the environment along the route. This guide covers the vehicle and driver side of dangerous goods transport by heavy commercial vehicles – its scope, hazard classes, mandatory equipment, driver certification, labeling, and the documents checked during inspection – in the order they come up in the field.

This document was prepared by the VADEN technical team as a general reference for heavy commercial vehicle operations. The information here is a general framework; for exact and current obligations, the applicable ADR text and national regulations are authoritative. Last updated: September 2026.

What is ADR? Scope and purpose

ADR is the abbreviation for the European Agreement concerning the International Carriage of Dangerous Goods by Road, setting out the packaging, labeling, vehicle equipment, driver training and transport-document requirements for substances in hazard classes such as explosives, gases, flammable liquids, oxidizers, toxic substances, radioactive materials, and corrosives. ADR rules form the shared framework of international and national regulations that make compliant transport of these substances mandatory.

The ADR agreement covers the road leg of the chain from the point a dangerous substance is manufactured until it reaches the end user. Packaging and labeling responsibility generally rests with the consignor; however, most of the obligations around vehicle equipment, load inspection, placarding, and driver certification fall on the carrier and driver. For a heavy commercial vehicle operator, ADR is not a one-time paperwork exercise but a compliance check repeated with every shipment.

In each country, the road-transport implementation of the ADR agreement is carried out through the national regulation governing the transport of dangerous goods by road; this regulation transposes ADR's technical annexes into domestic law and assigns inspection authority to the relevant agencies. Questions such as which equipment a vehicle needs for a given class, or which specialized training a driver must complete, depend on the UN number and class of the substance being carried; there is therefore no single generic definition of an "ADR-compliant vehicle" – compliance is always assessed against the specific load.

Who is ADR mandatory for?

ADR requirements apply to every vehicle, driver, and carrier transporting a load that falls into a dangerous goods class above a certain quantity by road. The scope is not limited to tankers or tank vehicles; a box-body truck carrying palletized or drummed dangerous goods can also fall under ADR, depending on the class and quantity of the substance carried. What determines this

is not the vehicle type but the hazard class, packing group, and quantity of the substance being transported.

Are there any exemptions?

ADR does not treat every dangerous goods shipment the same way. Small packaging units known as limited quantities (LQ) and excepted quantities (EQ) may, under certain conditions, be exempt from the full ADR equipment and driver-certification requirements; these packages are identified by their own distinct markings. In addition, when the total quantity carried stays below a class-weighted threshold, tiered exemptions may apply to vehicle equipment and driver certification. Whether an exemption applies to a given shipment must be verified solely against the current ADR text and the substance's safety data sheet; acting on an assumed exemption creates serious problems during inspection.

Setting out unprepared with a shipment that falls under ADR, on the assumption it is out of scope or that "a small quantity is exempt anyway," can lead to both administrative penalties and consequences that are hard to reverse in the event of an accident. Exemption assessment must always be based on the substance's UN number, packing group, and quantity carried, checked against current regulations.

What are the dangerous goods classes?

ADR divides dangerous goods into nine main classes based on their physical and chemical behavior. The class number indicates the primary type of risk the substance carries, and packaging, labeling, and vehicle equipment selection are all based on this classification. Subgroups exist within the same class (for example, class 4 has three subdivisions and class 5 has two); exactly which subgroup a substance falls into is stated in the safety data sheet and the transport document.

ADR hazard classes (general framework)

Class	Definition	Common example
1	Explosive substances and articles	Fireworks, explosive charges, detonators
2	Gases (compressed, liquefied, or dissolved)	LPG, oxygen cylinders, refrigerant gas
3	Flammable liquids	Gasoline, paint thinner, certain solvents
4.1 / 4.2 / 4.3	Flammable solids / substances liable to spontaneous combustion / substances that emit flammable gases on contact with water	Sulfur, certain metal powders, calcium carbide
5.1 / 5.2	Oxidizing substances / organic peroxides	Ammonium nitrate, certain bleaching compounds
6.1 / 6.2	Toxic substances / infectious substances	Certain pesticides, clinical/biological samples

Class	Definition	Common example
7	Radioactive material	Industrial or medical radioactive sources
8	Corrosive substances	Battery acid, certain industrial cleaners
9	Miscellaneous dangerous substances and articles	Lithium batteries, dry ice, environmentally hazardous substances

Among the loads most commonly encountered in the field are fuel and its derivatives (class 3), LPG and industrial gases (class 2), battery and industrial chemical transport (class 8), and lithium battery shipments (class 9). The expansion of class 9's scope in recent years – particularly around electric vehicle battery and energy storage unit transport – has made ADR knowledge increasingly critical for the logistics sector.

What equipment must be on board an ADR vehicle?

Every vehicle within ADR scope must carry a general equipment set, most of which is required regardless of the class of substance being transported. This equipment is needed so the driver can perform first response and protect themselves in the event of an accident or leak; these are the items most commonly checked during inspection.

- **Wheel chock:** Sized to match the vehicle's maximum mass and wheel diameter, at least one per vehicle.
- **Two self-standing warning signs:** A triangular reflector or equivalent, to be placed behind and in front of the vehicle in case of breakdown or accident.
- **High-visibility vest:** One for each crew member on board.
- **Flashlight:** A spark-free, explosion-safe type; one for each crew member on board.
- **Protective gloves and eye protection:** One set for each crew member on board, to be used during loading/unloading or leak response.
- **Fire extinguisher:** Minimum capacity increasing in steps based on the vehicle's maximum mass, with at least one unit accessible for a cab/engine fire.
- **Eye-rinsing liquid:** As a rule part of the general equipment on shipments within ADR scope; an exemption may apply only to loads carrying certain class 1 (explosive) and class 2 (gas) hazard labels – whether it is required for a given shipment must be verified against the current ADR text and with the competent authority.

What class-specific additional equipment is required?

On top of the general equipment, additional items may become mandatory depending on the class of substance carried: an emergency escape mask, a shovel, a drain-cover sheet (drain seal), a spill-collection container, or extra protective clothing are some examples. The complete list of this additional equipment is stated in the written instructions accompanying the transport document (the emergency instruction card) and must be verified by the person responsible for

the shipment before loading. Having the general equipment on board does not remove the need for class-specific additional equipment.

Checking that a fire extinguisher is present is not enough; it must also be confirmed that the pressure gauge is in the green zone and that the last refill/inspection date has not passed. An extinguisher past its date or with low pressure is treated the same as "not present" during inspection.

Standards and further reading

For the regulatory background on this subject, see [Directive 2008/68/EC \(inland transport of dangerous goods\)](#). Always confirm specific figures and procedures against the current regulation and the vehicle manufacturer service data.

How is the driver ADR training certificate obtained?

A driver carrying dangerous goods under ADR must hold a training certificate obtained by completing a basic training program and passing the related exam. This certificate is an official document, valid for a set period, issued so that the driver can recognize hazard classes, act correctly in an emergency, and know the points to watch during loading/unloading. The core part of the training covers information common to all classes; drivers who will work with tank vehicles or with loads carrying special risk, such as the explosives or radioactive classes, must also complete specialized training.

Which classes does the ADR certificate cover?

A driver's ADR training certificate is issued to cover specific classes or transport modes (packaged goods, bulk/tank transport, the explosives class, the radioactive class) based on the training module completed. The certificate also states which modules were covered; a driver who has only completed packaged-goods training operating a tank vehicle falls outside the certificate's scope. Before the certificate's validity period expires, it can be extended through refresher training and an exam; transport carried out with an expired certificate is treated the same as transport without a certificate.

How are orange plates and labeling applied?

The orange plate is the basic marking that makes a vehicle within ADR scope recognizable from a distance on the road, and it is used in two different forms. The plain orange plate, without numbers, is fitted to the front and rear of vehicles carrying mixed packaged goods and shows only that the vehicle falls under ADR, without indicating the type of substance carried. The numbered orange plate is used when a single substance is carried in bulk or in a tank; the hazard identification number (Kemler code) appears on the top half of the plate and the UN number on the bottom half, and this combination tells emergency responders what the substance is within seconds.

Labeling is a separate layer from the plate. Class-specific, diamond-shaped colored hazard labels appear both on the packaging and on the side and rear surfaces of vehicles carrying tanks or containers; for substances with more than one hazard property, the primary and secondary labels are used together. The label's color and pictogram indicate the class, and the class number printed on it indicates the subcategory; an incorrect or missing label can lead an emergency response team to apply the wrong procedure.

Setting out with an orange plate or label left over from a previous shipment means both sending an unnecessary hazard signal and misrepresenting the actual load. Before every loading, it must be confirmed that the plates and labels exactly match the current load being carried, and after unloading, that they are cleaned and removed if no longer needed.

What documents are requested in the transport document and during inspection?

The transport document is the starting point of an ADR inspection and contains information such as the substance's name, UN number, class, packing group, and quantity carried. When this document is not complete and legible, the inspection team does not treat the vehicle as carrying an out-of-scope load – quite the opposite, it treats the load as unidentified and risky. The following documents are the items most commonly requested in the field during dangerous goods transport by heavy commercial vehicle.

- **Transport document:** Substance name, UN number, class, packing group, quantity, and consignor/consignee information.
- **Written instructions (emergency instruction card):** Class-specific first-response information that must be within the driver's reach inside the cab.
- **Driver ADR training certificate:** An original copy, valid and matching the class and transport mode carried.
- **Vehicle approval/conformity certificate:** For tank vehicles and certain classes, the document showing the vehicle is technically compliant with ADR requirements.
- **Carrier authorization and identity documents:** Documents showing the identity of the driver and vehicle owner/operator, and the authorization to carry out the transport.
- **Safety adviser appointment (where required):** Mandatory for businesses that transport or handle dangerous goods above a certain volume.

How is an ADR-compliant loading and shipment prepared? Step by step

- 1 Verify the UN number, class, and packing group of the substance to be transported from the safety data sheet.
- 2 Check that the packaging or container is approved for the relevant class and carries a test mark.

- 3 If loads from different classes are being loaded onto the same vehicle, check the mixed-loading restrictions substance by substance.
- 4 Confirm the vehicle has the general and class-specific equipment required for the class being carried (fire extinguisher, wheel chock, personal protective equipment, additional materials).
- 5 Place and secure the load in the vehicle; take the necessary safety precautions against the risk of leaking, tipping, and shifting.
- 6 Remove any orange plate or label left from a previous shipment, and fit the correct plate (numbered or plain) matching the current load.
- 7 Place the hazard labels (diamonds) on the packaging and/or vehicle surfaces, in the position appropriate for the class.
- 8 Prepare the transport document completely, with the substance name, UN number, class, packing group, quantity, and party information.
- 9 Place the written instructions (emergency instruction card) inside the cab where the driver can easily reach them.
- 10 Check the validity date of the driver's ADR training certificate and that its scope matches the class being carried.
- 11 Before departure, carry out an exterior vehicle check — confirm the wheel chock, extinguisher, warning signs, plate, and labels are in place, and keep a record.

Points to watch: common mistakes

- **Setting out with the plate/label from an old shipment:** A marking that does not match the current load both gives incorrect information and gets questioned during inspection.
- **Skipping the mixed-loading restrictions:** Some classes cannot be carried together in the same vehicle; this check must be done before loading.
- **Shipping with an expired driver certificate:** Once the certificate's validity has expired, the transport is treated the same as transport without a certificate.
- **Keeping the written instructions outside the cab (in the rear compartment):** Instructions not within the driver's reach in an emergency lose their function.
- **Checking only that the fire extinguisher is "present":** A check that does not include the pressure gauge and the inspection/refill date is incomplete.
- **Treating an empty but uncleaned tank as "unloaded":** A tank containing residue generally continues to be treated as carrying dangerous goods even after it has been emptied.
- **Confusing class-specific additional equipment with general equipment:** Having the general equipment complete does not remove the requirement for class-specific additional materials.

Technical values and inspection points

The table below summarizes the main items commonly checked in the field during ADR inspections, along with general reference figures. Exact measurements, capacities, and time periods may vary according to the applicable ADR text and national regulations; in practice, the current text is authoritative.

ADR vehicle and document inspection points (general reference)

Inspection point	General reference	What a deviation indicates
Driver training certificate validity	Valid for a set number of years, extendable with refresher training	If expired, counts as transport without a certificate
Fire extinguisher capacity	Tiered according to the vehicle's maximum mass, more than one extinguisher may be required	Counts as deficient if capacity is insufficient or the date has passed
Orange plate size and position	Standard rectangular dimensions, visible position at front and rear of the vehicle	A missing, damaged, or incorrectly positioned plate impairs readability
Hazard label (diamond) size	Standard square shape, positioned rotated 45 degrees	A small or faded label makes recognition from a distance difficult
Transport document content	Substance name, UN number, class, packing group, and quantity complete	A missing field is treated as an unidentified load during inspection
Vehicle approval/conformity certificate (tank vehicles)	A dated document renewed through periodic inspection	If expired, the vehicle is considered unsuitable for tank transport

The table above is intended as a general reminder; no item replaces the definition in the current ADR text and national regulations. When preparing a pre-inspection checklist, the applicable official source must always be used as the reference.

How is fleet-wide ADR compliance maintained?

ADR compliance is less a one-time check than an ongoing discipline that a fleet operation must track continuously. The validity calendar of driver certificates, the renewal dates of vehicle approval certificates, and the inspection period of consumable equipment such as fire extinguishers are items that need to be tracked separately. Keeping this tracking centralized in a single table prevents last-minute gaps from being discovered at the moment of shipment.

Businesses that transport or handle dangerous goods above a certain volume are required to appoint a safety adviser (DGSA); the adviser's role is to periodically review the business's ADR processes, report deficiencies, and prepare the annual activity report. In smaller businesses, this role can also be covered through an outsourced service; what matters is that the role is actually carried out.

On the driver side, scheduling refresher training before it expires, regularly comparing the certificate's scope against the class the vehicle carries, and applying a short checklist before every shipment prevent most of the problems encountered during inspection before they arise. For a fleet manager, the cheapest precaution is tying certificate and inspection dates to a calendar.

On the driver side, that same calendar discipline takes the form of driving and rest records; device types, card use and the data download routine are covered in the **tachograph** guide.

ADR and the VADEN technical guide library

ADR compliance is a legal and operational discipline achieved not by purchasing parts or equipment but by correctly managing training, documentation, and inspection processes. VADEN ORIGINAL does not offer products in this area; the information shared here is prepared to give fleet managers and drivers a general reference and does not replace the applicable ADR text or national regulations. For a dangerous-goods vehicle to pass inspection without issue also requires its brake, air, and electrical systems to be in full working order; the VADEN technical guide library includes separate fault, replacement, and maintenance guides on topics such as the **air brake compressor**, **air dryer (air processing unit)**, **ABS sensor**, and **brake chamber**; parts on the air supply side are listed under the **air brake compressors** category.

This document is for information only; in practice the vehicle manufacturer's current service manual and safety instructions apply. Values are general references for common heavy-duty systems; use the relevant OE service document for model-specific figures. © VADEN Otomotiv San. Tic. A.Ş. · vadenoriginal.com