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Transportation of Dangerous Goods by Road

Compiled by Foresight Publications ...Making sense of it

INTRODUCTION

Carrying goods by road involves the risk of traffic accidents. If the goods carried are dangerous, there is the additional risk of an incident, such as spillage of the goods, leading to hazards such as fire, explosion, chemical burns or environmental pollution damage. "I didn't know" or "Nobody told me" is not acceptable as an excuse in court and contravention of the law can also lead to an insurance claim being repudiated. This document summarises the legal requirements for the transport of dangerous goods by road in South Africa and the neighbouring SADC countries.

THE DANGERS

Dangerous goods are substances or articles that present an immediate hazard to people, property or the environment. Tested and assessed against United Nations criteria and found to be potentially dangerous when transported, they are assigned to one of the following different classes depending on their predominant hazard.

Class/division Diamond	Description	Examples
	**Class 1 - Explosives:** There are six divisions.	High explosives such as dynamite, bombs and grenades, sodium pycramate, ammunition, flares and fireworks.
	**Division 2.1 - Flammable gases:** Easily catch fire when exposed to a spark or flame.	Acetylene, butane, calor gas, dimethyl ether, hydrogen, LPG, methane, propane, propylene, tetrafluoroethylene, vinyl chloride.
	**Division 2.2 - Non-flammable, non-toxic gases:** Dangerous because they are compressed or for other reasons such as depriving the air of oxygen.	Argon, carbon dioxide, helium, oxygen, sulphur hexafluoride.
	**Division 2.3 - Toxic gases:** Poisonous.	Ammonia, chlorine, carbon monoxide, hydrogen chloride, methyl bromide, phosgene, sulphur dioxide.

	**Class 3 - Flammable liquids:** Ignite easily and burn fiercely.	Carbon disulphide, diethyl ether, acetone, benzene, petrol, tar, toluene, camphor oil, diesel, ethanol, methanol, paraffin, turpentine.
	**Division 4.1 - Flammable solids:** Easily lit by spark or flame or burn readily or can catch fire through friction.	Camphor, hexamine, matches, naphthalene, red phosphorous, rubber scrap, wax polish.
	**Division 4.2 - Spontaneously combustible:** Liquids or solids which generate their own heat and self-ignite.	Activated carbon, cotton waste, fishmeal, maneb, metal shavings, oil/seedcake, sodium sulphide, white phosphorous.
	**Division 4.3 — Water reactive substances:** Produces flammable or toxic gases if wet or reacts violently if mixed with water.	Aluminium phosphide, calcium carbide, lithium, magnesium powder, sodium, zinc dust.
	**Division 5.1 - Oxidizers:** Although not necessarily combustible themselves, can cause or contribute to combustion of other material.	Ammonium nitrate, calcium hypochlorite, hydrogen peroxide, lead nitrate, lead dioxide.
	**Division 5.2: - Organic peroxides:** Sensitive to heat and thermally unstable.	Benzoyl peroxide, di-tert-butyl peroxide.
	**Division 6.1 - Toxic substances:** Cause illness or death if swallowed, inhaled or if absorbed by skin. Nearly all emit poisonous gases in a fire.	Arsenic, cadmium oxide, cadmium chloride, carbon tetra bromide, creosote, cyanides, methylene chloride, phenol, some pesticides.
	**Division 6.2 - Infectious substances:** Contain bacteria, viruses, parasites or fungi which cause disease in humans or animals.	Medical waste, pathological specimens.
	**Class 7: Radioactive materials:** Exposure may cause damage to living tissue	Radium, cobalt, radon, uranium, plutonium.

	**Class 8: Corrosives:** Solids or liquids that attack skin, clothing, metal and other materials.	Acids and alkalis such as calcium oxide, iodine, sodium hydroxide (caustic soda) sodium hypochlorate (bleach), zinc chloride (soldering flux).
	**Class 9 - Miscellaneous:** Goods which cannot be classified in any other class, e.g. environmentally hazardous or substances carried at elevated temperatures.	Air bag modules, asbestos, lithium batteries.

Some are further subdivided into packing groups I, II and III according to the degree of danger, packing group I being the most severe. All are identified and allocated a four-digit UN code number which can be looked up in the Dangerous Goods List which tables further information enabling safe transport of the commodity. Many have properties which relate to more than one class or division. Where there is a secondary danger,in addition to the primary risk, goods are also allocated a "subsidiary risk". Sometimes there are two subsidiary risks.

LEGAL FRAMEWORK

The transportation of dangerous goods is regulated under Chapter VIII of the National Road Traffic Act, 1996 and Chapter VIII of the National Road Traffic Regulations, 2000 (commonly referred to as the Dangerous Goods Regulations) in order to protect everyone directly involved (such as consignors or carriers), or those who might become involved (such as members of the emergency services and public). The Dangerous Goods Regulations, which also incorporate the following SA National Standards (SANS) compiled by the SA Bureau of Standards, obliges transport operators involved in the carriage of dangerous goods, to ensure that they know what they have to do to minimise the risk of incidents as well as guarantee an effective response.

SANS 10228: The identification and classification of dangerous goods for transport by road and rail modes.
SANS 10229-1: Transport of dangerous goods - Packaging and large packaging for road and rail transport Part 1: Packaging.
SANS 10229-2: Transport of dangerous goods - Packaging and large packaging for road and rail transport Part 2: Large packaging.
SANS 10231: Transport of dangerous goods - Operational requirements for road vehicles.
SANS 10232-1: Transport of dangerous goods - Emergency information systems Part 1: Emergency information system for road transport.
SANS 10232-3: Transport of dangerous goods - Emergency information systems Part 3: Emergency response guides.
SANS 10232-4: Transport of dangerous goods - Emergency information systems Part 4: Transport emergency card.
SANS 10233: Transport of dangerous goods - Intermediate bulk containers for road and rail transport.
SANS 1518: Transport of dangerous goods - Design, construction, testing, approval and maintenance of road vehicles and portable tanks.

In addition, SANS 10231, above, requires compliance with SANS 10187: Load securement on vehicles. Split into nine parts, Part 8 of this standard deals specifically with dangerous goods.

The Fire Brigade Services Act, 1987 (section 16) empowers local fire departments to make by-laws controlling the transport of dangerous goods. When issuing permits under these by-laws, municipalities follow guidelines tabled in SANS 1157: Transport of dangerous goods - Inspection requirements of road vehicles for the issue of municipal dangerous goods transport permits.

The transport of explosives (class 1) is further governed by Chapter 6 of the Explosives Regulations promulgated under the Explosives Act, 1956, while transportation of radioactives (class 7) is further controlled under section 7 of the Nuclear Regulatory Act, 1999 which provides for the application of Regulations for the Safe Transport of Radioactive Materials compiled by the International Atomic Energy Agency in Vienna.

VEHICLES AFFECTED

The Dangerous Goods Regulations apply to all vehicles, irrespective of weight, used to transport dangerous goods above certain amounts referred to as "Exempt Quantities". These quantities range from none to 1 000 kg or litres depending on the commodity, the packing group (degree of danger) and subsidiary risk, if any. For example, a wholesaler may use his 10-tonne truck to deliver up to 12 x 4 kg (totalling 48 kg) containers of HTH granular chlorine without having to comply as the amount does not exceed the exempt quantity of 50 kg for this particular substance. On the other hand, a retailer using his bakkie to collect a consignment of 13 containers (52 kg) would have to comply. South African registered vehicles are affected wherever they may be and foreign vehicles must comply while they are in South Africa.

VEHICLE SPECIFICATIONS

In order to be used to transport dangerous goods, vehicles must comply with numerous safety specifications which are listed in SANS 1518 and SANS 1157. In addition, vehicles used to transport explosives must be approved by an inspector of explosives and comply with the Specifications for the Construction and Licensing of Mechanically Propelled Vehicles for the Conveyance of Explosives issued by the SA Police.

The driver, or some other appointed employee must conduct a daily vehicle check at the start of each shift and all vehicles (not just heavy vehicles) must also undergo additional routine inspections. The annual roadworthy test required to re-licence all goods vehicles above 3 500 kg GVM also applies to lighter goods vehicles used to carry dangerous goods.

FIRE EXTINGUISHERS

All vehicles carrying dangerous goods must be fitted with fire extinguishers. Minimum requirements are tabled below.

FIRE EXTINGUISHERS ON ROAD VEHICLES TRANSPORTING DANGEROUS GOODS

Vehicle type	Minimum requirements
Freight carriers (rigid vehicles) above 3 500 kg GVM	Two 9 kg capacity
Trailers and semi-trailers above 3 500 kg GVM	Two 9 kg capacity
Truck-tractors	One 9 kg capacity
Vehicle up to 3 500 kg GVM	One 9 kg or two 4,5 kg capacity

They must be of the dry powder type and suitable for fighting class A, B and C fires; be mounted in an easily accessible quick release bracket; be fully charged; display a legible test stamp (in accordance with SANS 1457).

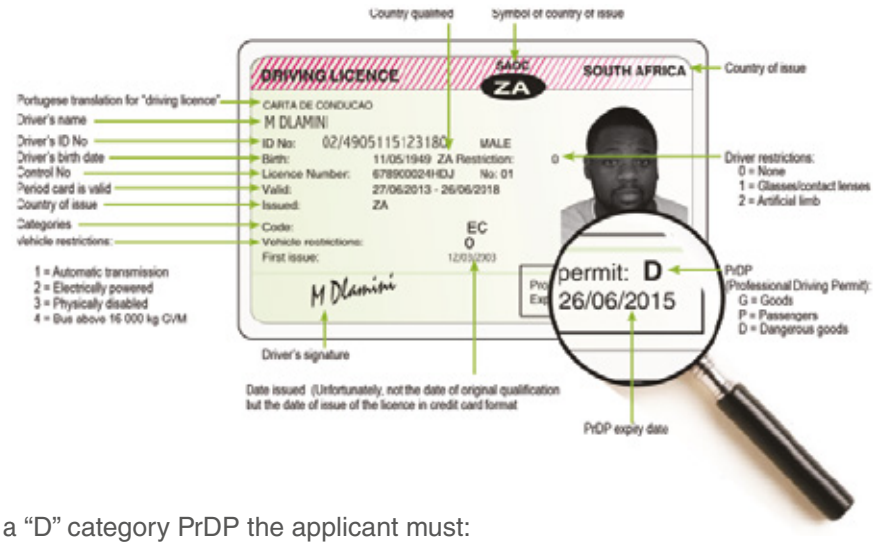
OPERATOR REGISTRATION

When licensing a vehicle, a transport operator must register with the vehicle licensing authority as a dangerous goods operator and ensure that each vehicle used to transport dangerous goods displays a valid “D” category operator card issued with the licence disc. This includes trailers and semi-trailers and even applies to light goods vehicles carrying dangerous goods. All are required to undergo an annual roadworthy test which must be carried out no more than 60 days prior to licence application.

DRIVER TRAINING AND LICENSING

Operators must ensure that drivers receive annual training, by an approved dangerous goods training body. This applies to both light and heavy goods vehicle drivers and training must be relevant to the type of vehicle and dangerous goods the driver is assigned.

Operators must also ensure that drivers of vehicles transporting dangerous goods are appropriately licensed for the vehicles they are employed to drive and, if the vehicle is above 3 500 kg GVM, that they possess a valid “D” category professional driving permit (PrDP) endorsed in the bottom right corner. Applications for PrDPs must be accompanied by a medical certificate and drivers must be fingerprinted and undergo a police check.



To qualify for a “D” category PrDP the applicant must:

- Produce a certificate issued by an approved training body within the previous six months,
- Be at least 25 years of age and have no record of any conviction of any crime involving violence in the past five years.

Operators must ensure that drivers:

- Are provided with whatever safety equipment is required, as detailed on the transport emergency card, and must be trained to use such equipment
- Can interpret and implement instructions as detailed on the transport emergency card.

The driver is also charged with certain duties such as ensuring that the vehicle has a valid operator card, is roadworthy and that the vehicle is appropriately placarded and the necessary appropriate documents are on board in the designated space.

While on the road, the driver must not allow any passengers or unauthorised persons in or on the vehicle. Pre-planned stops (e.g. for two-hourly tyre and spillage checks) must be made away from the main traffic flow. In the event of an incident, the driver must follow the instructions on the transport emergency card/s.

LOADING AND UNLOADING

Loading and unloading of dangerous goods must be carried out by a qualified person trained in the relevant procedures and nominated by the transport operator, consignor or consignee. Before commencing loading or offloading, the qualified person is responsible for ensuring it is safe to proceed.

On loading, the qualified person must check that:

- Goods are correctly classified, packaged and labelled
- The vehicle is suitable, clean and fit to load if goods being loaded are different from those previously transported and that the load area is safe to receive the goods
- Where substances belonging to different hazard classes are being loaded onto the vehicle, that they are compatible and loaded in accordance with the Load Compatibility Chart
- The correct quantity is loaded in accordance with legal mass and dimension limits and the cargo is undamaged and properly secured (in accordance with SANS 10187) so as to minimise the risk of spillage should there be an incident on the road
- Placarding reflects the correct and relevant information, the driver has the correct transport emergency card/s and dangerous goods declaration and any special provisions indicated for the road transport of the commodity are adhered to.

There are also a number of checks prescribed when offloading.

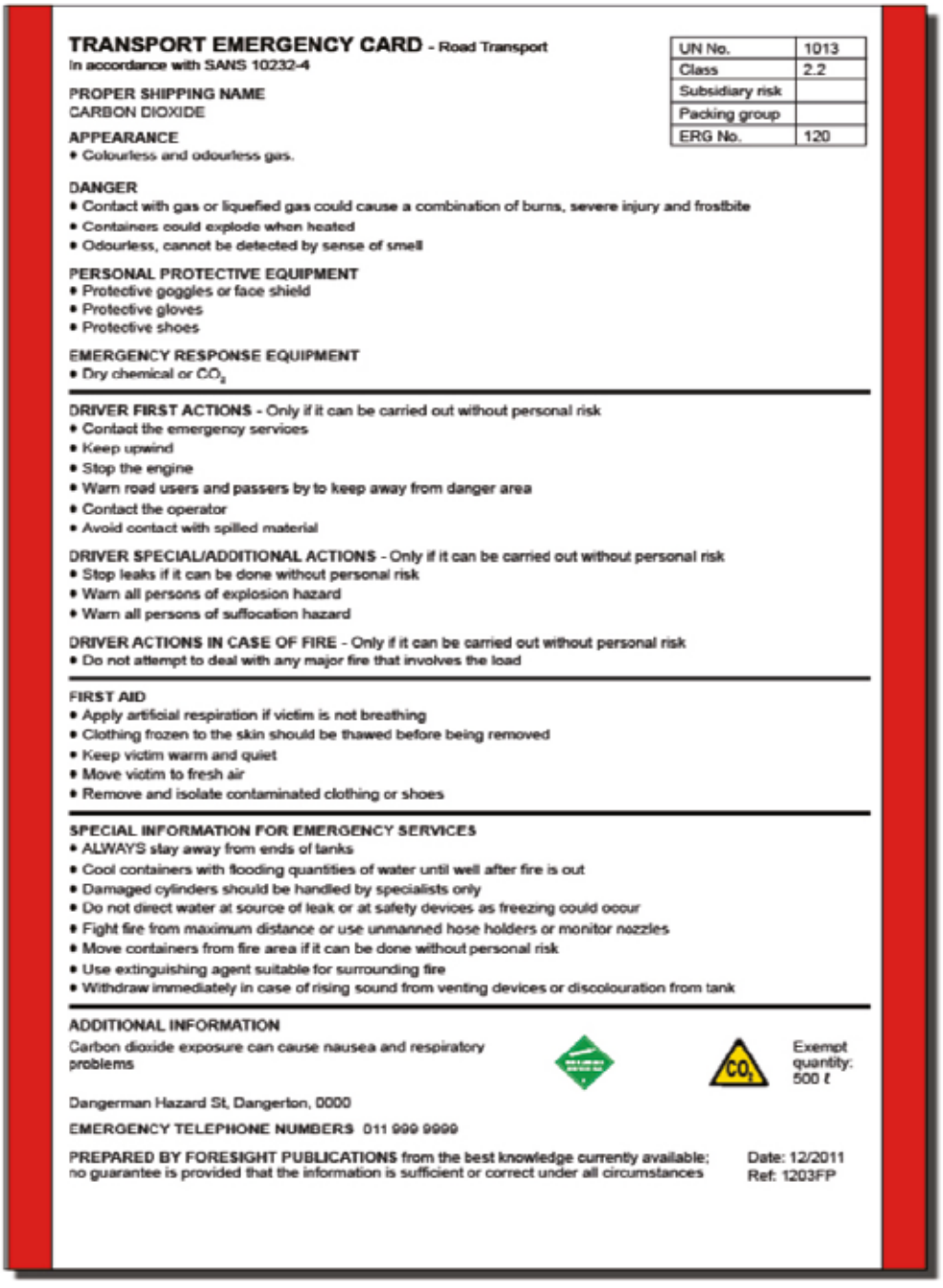
When part of a packaged cargo has been offloaded, any remaining packages of dangerous goods must be rearranged, if necessary, to maintain proper stowage and security of the load. Also, the qualified person must ensure that the remaining documentation and placarding reflect the changed load.

SHIPPING DOCUMENTS

In the event of an incident on the public road, it is essential that the driver and emergency services are able to take appropriate action. For this reason the following documents must accompany the load - dangerous goods declarations describing and quantifying the dangerous goods being transported and transport emergency cards (TRECs) instructing the driver what to do.

Although the dangerous goods declaration may be incorporated into a consignment note, delivery note or waybill, it must bear the heading “DANGEROUS GOODS DECLARATION”. Apart from correctly identifying the goods, it must include prescribed declarations signed by the consignor that the consignment is correctly described, packaged and classified and by the driver acknowledging that the vehicle is appropriately placarded and that he or she has all the necessary documentation.

There must be a card for each dangerous goods item in the load and the consignor must either supply the transport emergency card or give enough information to enable the transport operator to obtain the correct cards. However, this does not absolve the operator from a legal obligation to ensure that cards are in fact appropriate to the load and it is vital that the driver read and understand the card for any product before it is loaded. Cards have a 10 mm red border bleeding off the left and right edges and photocopies are not acceptable. In order to ensure that the information is reasonably up to date, cards are valid for no more than three years and the expiry date is found at the bottom right corner.



TRANSPORT EMERGENCY CARD - Road Transport
In accordance with SANS 10232-4

UN No.	1013
Class	2.2
Subsidiary risk	
Packing group	
ERG No.	120

PROPER SHIPPING NAME
CARBON DIOXIDE

APPEARANCE
- Colourless and odourless gas.

DANGER
- Contact with gas or liquefied gas could cause a combination of burns, severe injury and frostbite
- Containers could explode when heated
- Odourless, cannot be detected by sense of smell

PERSONAL PROTECTIVE EQUIPMENT
- Protective goggles or face shield
- Protective gloves
- Protective shoes

EMERGENCY RESPONSE EQUIPMENT
- Dry chemical or CO_2

DRIVER FIRST ACTIONS - Only if it can be carried out without personal risk
- Contact the emergency services
- Keep upwind
- Stop the engine
- Warn road users and passers by to keep away from danger area
- Contact the operator
- Avoid contact with spilled material

DRIVER SPECIAL/ADDITIONAL ACTIONS - Only if it can be carried out without personal risk
- Stop leaks if it can be done without personal risk
- Warn all persons of explosion hazard
- Warn all persons of suffocation hazard

DRIVER ACTIONS IN CASE OF FIRE - Only if it can be carried out without personal risk
- Do not attempt to deal with any major fire that involves the load

FIRST AID
- Apply artificial respiration if victim is not breathing
- Clothing frozen to the skin should be thawed before being removed
- Keep victim warm and quiet
- Move victim to fresh air
- Remove and isolate contaminated clothing or shoes

SPECIAL INFORMATION FOR EMERGENCY SERVICES
- ALWAYS stay away from ends of tanks
- Cool containers with flooding quantities of water until well after fire is out
- Damaged cylinders should be handled by specialists only
- Do not direct water at source of leak or at safety devices as freezing could occur
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles
- Move containers from fire area if it can be done without personal risk
- Use extinguishing agent suitable for surrounding fire
- Withdraw immediately in case of rising sound from venting devices or discolouration from tank

ADDITIONAL INFORMATION
Carbon dioxide exposure can cause nausea and respiratory problems

Exempt quantity: 500 ℓ

Dangerman Hazard St, Dangerton, 0000

EMERGENCY TELEPHONE NUMBERS 011 999 9999

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DESIGNATED SPACE

In order that the driver and emergency service personnel are able to quickly locate documentation relevant to the goods being carried and, more importantly, not be able to pick up and use the wrong information, transport emergency cards, dangerous goods declarations and, where applicable, any other required documents such as a waste classification certificate, container packing certificate or permit/licence to convey explosives, must be placed inside the cabin in what is termed the “designated space”.

This is specified as:

- An orange container marked “DOCUMENTS” in black, permanently fixed in place
- Positioned near the centre of the cab clearly visible and easily reachable from either door or through a broken window.

Only documents relevant to the load being carried must be stored in the designated space. As goods are loaded and offloaded, documents no longer applicable must be removed from the container.

In the case of road tankers and bulk carriers, documents must be retained in the designated space until the vehicle has been certified clean. In the case of packaged goods and IBCs, documents must be removed from the designated space immediately after all the goods have been offloaded provided there is no spillage.

PLACARDING

Vehicles carrying dangerous goods in excess of the exempt quantity must be placarded as prescribed in SANS 10232-1 in order for first responders to immediately identify the dangers associated with a particular cargo so that appropriate information can be sourced to deal with an incident involving spillage or fire. The consignor must supply the transport operator with either the placards or information to ensure the vehicle is correctly placarded for his consignment. The driver must see that the placards are in place and a qualified person must not allow a vehicle to move without the correct placarding.

In order to properly placard a vehicle, the qualified person must:

- Review the shipping documents -
- Observe the packaging labels refer to the Dangerous Goods List.

Certain rules must be followed when placarding mixed or multi-loads.

In the case of road tankers and bulk carriers, placarding must remain affixed until the load has been certified clean. In the case of packaged goods and IBCs all placarding must be removed once the vehicle no longer carries dangerous goods.

There are a number of additional placarding requirements for certain loads.

SPECIAL PROVISIONS

There are numerous requirements for dealing with different commodities. These special provisions and instructions must be observed where appropriate and are given a numbered code which appears, where applicable, in the Dangerous Goods List. There are also four sets of special provisions specifically for road transport. These concern the carriage of packaged goods, the carriage of bulk loading and handling operations operational requirements.

These must then be looked up, in the Dangerous Goods Digest in order to comply with obligations.

IN THE EVENT OF AN INCIDENT

In the event of becoming aware of an incident, the incident report procedure must be followed. The operator must also arrange for the necessary repair or for a replacement vehicle. Any replacement vehicle or driver must also comply with the requirements.

Any transfer of cargo as a result of overloading or an incident en-route must be treated as an incident requiring the emergency services to be notified and a qualified person must supervise the transfer. Where a vehicle carrying dangerous goods has been stopped and found to be overloaded it can, in some cases, be safer to allow the vehicle to proceed under the escort of the emergency services to another site where transfer of the cargo can be carried out without undue risk.

INSURANCE

Operators must ensure that insurance, based on the hazard and risk of the goods transported, covers civil liability, recovery and rehabilitation costs.

The rehabilitation of an area after a pollution incident may well be the most costly part of the whole exercise. It often involves the removal of very considerable quantities of soil for treatment at a waste disposal site and replacement of good quality soil. It is because of these potential costs that rapid action is necessary in the event of a spill. The owner of the load is responsible for the rehabilitation of a site after a fire or spillage. Unless otherwise specified in the transportation contract, this will be the carrier. Whoever is responsible must appreciate the potential problem and make suitable contingency plans to cater for such eventualities. If he does not have adequate resources himself, he will need to negotiate with a competent body, preferably prior to any incident occurring.

He should also be equipped to rush supplies of absorbent or neutralising agent to any spillage to assist the local fire brigade in diminishing the extent of damage and easing the task of rehabilitation.

FURTHER INFORMATION

For complete A-Z coverage of legal requirements and all aspects concerning the transportation of dangerous goods by road consult the Dangerous Goods Digest, exclusively available from the publishers, Foresight Publications.

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