

## Safety Advice.

### 11 – Transport of gas receptacles in vehicles.



#### Introduction

This Safety Advice is a recommendation for the safe transport of gas receptacles by road in vehicles. They can be applied appropriately for cryogenic receptacles. They apply to both filled and empty receptacles. If other hazardous goods are being transported besides the gases, additional regulations may have to be observed. Binding regulations on transporting hazardous goods by road are not superseded by these instructions. Rather, this advice must be regarded as a supplement to such regulations. Following the instructions safeguards your own safety, as well as avoiding the possibility of incurring fines due to the contravention of regulations.



#### Vehicles

Road vehicles such as trucks, works vehicles, estate cars, normal automobiles and trailers (including single-axle trailers) are only suitable for transporting gas receptacles (gas cylinders, cryogenic receptacles) if

- they can be suitably ventilated and



- the receptacles can be reliably secured to prevent them rolling away or falling.

Additional special regulations apply as from certain quantities – but this will be dealt with later.

#### Before starting the journey

Before loading gas cylinders into the vehicle, pressure reducers and other fittings must be unscrewed from the cylinder valves. It is particularly necessary to check that the valves are free of leaks in the case of cylinders used for flammable or toxic gases. This can be done with, for example, leakage spray. Where stipulated, the hexagon cap nuts must be screwed tightly onto the valve side glands (e.g. in the case of fluorine).



All cylinder valves must be protected against damage by screwing on cylinder caps, with the exception of those cylinders on which the valves are protected by a permanently installed cylinder collar. Small gas cylinders on which no permanent valve protection is fitted and those onto which no cylinder cap can be screwed must be transported in cylinder cases or boxes designed for that purpose in order to protect the valves.

Open cryogenic receptacles (e.g. for nitrogen and other inert low-temperature gases) must not be sealed gas-tight during transport. This is to prevent impermissible overpressures from building up. Only the correct dispensing fixture, the cover cap or the original plug for the neck pipe may be

fitted on the cryogenic receptacle.

#### Load protection

To prevent the receptacles themselves being damaged or damaging other goods in the event of breakage, turning a curve or accidents, they must be secured by suitable means.



Fastenable belts are examples of fixtures which have proven to be suitable for securing loads. These must be attached to sufficiently stable parts of the vehicle. In the vicinity of the vehicle's front panel, gas cylinders must always be loaded horizontally with respect to the direction of travel (standing up or lying down). More information on this can be read in the brochure "Transport of gas cylinders, pallets and bundles on road vehicles". This can be obtained free of charge from our service offices.

#### Ventilation

The loading area must be sufficiently ventilated. This is in any case no problem if the loading bay is open. If the loading bay is covered, it should be possible to provide diagonal ventilation at the front and rear, preferably at the top and bottom.

It is more difficult to ventilate a delivery truck, an estate car or even the boot of an ordinary car. But this problem too can be solved: In each case, provide 1/10 of the area of all gas cylinders being transported at the same time as the incoming and outgoing air opening. (Normally, a ventilation opening of approximately 100 cm<sup>2</sup> is sufficient). If both openings are diagonal, this

can be regarded as sufficient ventilation. Permanently installed gill-type or rosette ventilation openings are advantageous. But beware: The openings must not be closed (e.g. stuck together).



In exceptional cases, open windows or an open boot can also be used for ventilation, but these must not be closed when the vehicle is parked. As we said, this is the exception not the rule!

### Smoking and naked flame

Smoking and naked flame are not recommended in and around the vehicle as long as it contains gas receptacles, irrespective of which ones and how many. The instructions outlined so far always apply, no matter whether you are on a business or private trip with one (!) or more gas receptacles.

### Transport below the free limits

If you are transporting only a few cylinders, no special driver training and no instructions in writing (tremcards) are required.

The "free limit" up to which this is possible depends on the type of gas (see the transport document, printed at the end of this Safety Advice). Attention: A few preconditions should be fulfilled:

- The gas receptacles must carry the necessary markings. This is normally the case with Linde receptacles.
- The total quantity for each transport unit (vehicle + any trailers) must not exceed 1000 (referred to as the "ADR points").
- If the transport is not carried by a private person or to a construction site, then a 2 kg fire extinguisher is needed.



However, you can note the following rule of thumb: You are always under the free limit with up to six large cylinders. In the case of certain gas types, this may also be significantly more. You can carry unlimited amounts of empty cylinders if you use a

transport paper. With the transport document printed at the end of these Safety Advice, you can quickly determine whether you are below or above the free limit. More precise information on this can be obtained from your Linde Service Office.

Of course, you must also follow without exception all conditions stated above (printed in bold face).

Further easing on regulations can exist in specific countries. In Germany, for example, it is not necessary to carry a transport document and a fire extinguisher in the vehicle.

### Transport above the free limits

To determine the free limits, we have solved the problem for you simply: Attached you find a transport document with which you can determine the free limits without complications.

Above these free limits you must be able to present the transport document completely filled in, containing the following details in a legible state:

- Name and address of the sender
- Name and address of the recipient
- Proper shipping name (complete)
- Number of receptacles
- Description of the receptacles
- Total quantity as a gross or net weight in kg or a net volume in litres.

The sender is normally you.

The recipient is, for example, Linde, your construction site, branch or even yourself if you again arrive at the "sender" at the end of the tour and have unloaded and loaded. A precise address is required.

Please refer to the stickers on the receptacles for the proper shipping name. In the attached transport document you will find the proper shipping names already pre-printed so that you only have to enter the number of receptacles in the corresponding line, (depending on the size of the receptacle in the appropriate column).

Reference is made to the description of the receptacles by way of a footnote right at the top in the heading of the attached transportation paper.

The net weight or the net volume are already entered for the various gases in the transport document (does not apply to empty cylinders).

With entries of empty goods the Multilateral Agreement M163 is to be carried till the end of 2006. If the transport documents also contains the various explanations, it is completely filled in.

If you use a vehicle, the maximum permissible total weight of which (as shown in the vehicle documentation) exceeds 3.5 t, the driver must be trained and must carry the certificate certifying successful participation (ADR certificate) while transporting the dangerous goods.

Only persons who are directly involved with the transport may travel in the vehicle. They may take with them their work colleagues to provide assistance with unloading or to show them the way.

However, one or more fire extinguishers must be carried in the vehicle:

- Fahrzeug > 7,5 to total capacity: 12 kg min. cap. of one extinguisher: 6 kg
- Fahrzeug > 3,5 to bis 7,5 to total capacity: 8 kg min. cap. of one extinguisher: 6 kg
- Fahrzeug ≤ 3,5 to total capacity: 4 kg

Your vehicle must carry at least two self-standing warning signs (e.g. reflective cone or warning triangle or orange lamps which are independent of the vehicle). In some countries such as Germany, it may be a legal requirement to carry an orange lamp. For each member of the vehicle crew, you also require a torch and a safety vest. The best place to obtain these warning symbols or lamps is from good commercial vehicle accessory dealers, who will also know which ones are needed.



You must also have on board in the cab the instructions in writing (if necessary several copies). The relevant instructions in writing can be obtained from your Linde supplier. If you are the loader, you must ensure that the required instruction in writing is provided. In most cases, the Linde instruction in writing will be the correct one.

One scotch per vehicle (do not forget the trailers) must also be provided. It is no longer necessary to have on board a tool kit for emergency repairs.



The safety equipment must correspond to the details in the instructions in writing. If toxic or corrosive gases are being transported, you require in the vehicle a gas

mask for the driver (and if necessary also for the front seat passenger) with a filter appropriate for the gas or breathing apparatus which is independent of the ambient air (escape hood).

Finally, the orange plate must be fitted to your vehicle and must be visible.

### After the journey

When loading and unloading, please switch off the engine. This reduces environmental damage and saves you from being fined. Always apply the hand brake when stopping and parking. Unload the gas receptacles from estate cars and automobile boots immediately after the journey because sufficient ventilation cannot be guaranteed if the vehicle is stationary.

To remove the gas, always remove the gas cylinders from the vehicle and only after you have done this fit them with pressure reducers.



The gas cylinders may remain in the vehicle only in workshop vehicles which are specially designed for that purpose.

Work with fire (welding, flame cutting, soldering etc.) may only be carried out in the vehicle if

- a consumption point unit is used downstream of the combustion gas pressure reducer,
- the doors remain held open during work with flames and
- a fire extinguisher (minimum PG 6) is to hand.

### Garages

Vehicles with gas containers may only be parked in garages if

- the loading room in which the receptacles are located remains ventilated and
- the garage is also well ventilated. This is normally the case in large garages (e.g. multi-storey car parks), but not in small garages (up to 25 m<sup>2</sup>) or in underground car parks.



In particular, note that there may be restrictions on parking with hazardous materials in some public or private garages or multi-storey car parks.

### Driving to other countries

When driving to other countries, besides the free limit you always require a transport document, instructions in writing in all languages of the countries through which you are passing and at least one fire extinguisher (minimum 2 kg). Above the free limit, you also require all other items printed in bold type in the section "Transport above the free limit".

### A recommendation

Police checks of dangerous goods transports are becoming more frequent and more detailed. Contraventions against the ADR are recorded as offences subject to penalty charges. A few hundred Euro can easily be incurred. Our recommendation: If you follow these instructions precisely, you can save yourself a lot of annoyance and certainly also fines.

### Conclusion

These instructions were compiled taking into account the exception regulations which applied at the time when these instructions were published (status: 01.01.2008).

These instructions can only be an extract from the very comprehensive and not always easily comprehensible regulations. They were compiled with the necessary care, but may still not cover every special case. In particular, no claims may be made against Linde if these instructions do not correspond with the currently valid regulations.

If in doubt, consult the person at your company who is responsible for hazardous goods or your safety specialist.

Binding information on the valid regulations are provided by the responsible authorities. Information on which authorities are responsible in various regions in individual cases can be obtained at, for example, a police station, where it is also possible to obtain information on the regulations.

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