Measuring the amount of gas in import containers

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Summary

Over the past few years the VROM (Ministry of Housing, Spatial Planning and the Environment) Inspectorate have regularly been confronted with problems concerning the freight containers that are treated with gas before being shipped to other countries, and which are handled (unloaded or transferred, but also, for example, inspected by Customs personnel or checked by other government institutions) in the Dutch docks.

As the VROM Inspectorate had insufficient insight into the total number of containers being imported into the Netherlands that still contain remnants of gaseous pesticides, the Inspectorate commissioned RIVM to carry out a study, in collaboration with its own personnel. The study also checked to see if a 'risk profile' could be drawn up for certain containers due to remnants of gaseous pesticides, depending on the country of origin, cargo or labelling. Another objective was to define how well the gaseous pesticides could be measured using field measuring equipment.

The study was based on a random sample of 303 containers. Measurements and analyses were carried out on the pesticides methyl bromide, formaldehyde, sulfuryl fluoride and phosphine, and several additional parameters, i.e. risk of explosion and oxygen levels, ammonia, carbon monoxide and carbon dioxide.

The study concluded that:

- the pesticides methyl bromide, formaldehyde and phosphine were found in 21% of the random sample of 303 containers. It is possible that other pesticides would also have been found if more measurement points had been checked per container, rather than just the single measurement point used in this study;
- sulfuryl fluoride was not found in any of the containers;
- a combination of two pesticides (methyl bromide with formaldehyde or phosphine) was found in three of the containers;
- 5% of the containers were considered to be a risk due to the concentrations of methyl bromide or formaldehyde, or the presence of phosphine-forming pesticides, which exceeded accepted MAC values (a well-known standard in the Netherlands for maximum concentrations of substances). Assuming that this random check constitutes a representative sample of the 4 million containers transported to Rotterdam docks each year, the study shows (with 95% certainty) that around 200,000 containers pass through Rotterdam each year, which form an increased risk to the health and safety of everyone handling these containers or working in their vicinity, as a result of the pesticides that they contain;
- 15% of the containers represented a risk due to low oxygen levels, risk of explosion or carbon dioxide/carbon monoxide levels higher than the accepted MAC values for these compounds. Assuming that this study constitutes a representative sample of the 4 million containers transported to Rotterdam docks each year, the study shows (with 95% certainty) that around 600,000 containers pass through Rotterdam each year, which form an increased risk to the health and safety of everyone handling these containers or working in their vicinity, as a result of oxygen levels, carbon dioxide/carbon monoxide levels, or risk of explosion.

- 20% of the containers formed a risk, either due to the presence of pesticides, or as a result of other parameters. The study concluded, with 95% certainty, that around 800,000 containers pass through Rotterdam each year which form a risk to the health and safety of those handling these containers or working in their vicinity, due to the pesticides they contain or as a result of other parameters;
- only three of the containers displayed any kind of 'warning' sticker;
- a sample profile focusing on containers of foodstuffs could result in double the number of containers being found to include gaseous pesticides;
- as yet, no suitable methodology exists for taking field measurements of sulfuryl fluoride and formaldehyde;
- from a safety point of view, the detector tubes for methyl bromide and the electrochemical cells for phosphine seem acceptable techniques for conducting field measurements.

1 Introduction
The VROM Inspectorate, which includes the former Inspectorate for Environmental Hygiene, is responsible for upholding the regulations for gaseous pesticides. Part of this work concerns containers of import goods that still contain remnants of pesticides when they arrive in the Netherlands. Methyl bromide, formaldehyde and phosphine are often used, and sulfuryl fluoride seems to be becoming more popular. If the containers are not degassed sufficiently, these compounds can lead to personnel being exposed to increased risk during unloading and transfer of the containers. This applies both to those handling the containers as well as those working in the vicinity. Gases such as methyl bromide also damage the ozone layer.

The VROM Inspectorate is regularly confronted with the problem of freight containers that have been loaded, under gas pressure, in other countries and which are unloaded, stored or transferred in Dutch docks, without the containers being completely gas-free. After an incident at Rotterdam Customs, where two customs officers became ill after inspecting a container that they later found apparently still contained gas, a gas measurement plan is now being developed for all freight containers to be inspected by customs personnel. The Customs and Excise department estimates that, to date, remnants of gaseous pesticides have been found in around 3.5% of the containers selected for inspection according to a risk profile drawn up for customs purposes. This percentage is considerably higher than would normally be expected, based on the details given concerning the cargo. The VROM Inspectorate had, until now, insufficient insight into the *total* number of containers being imported into the Netherlands which still contain gaseous pesticides, and how much of a health and safety risk was involved in opening these containers. Also whether or not, for the total number of containers imported into the Netherlands, this presented a considerable, or less considerable, problem.

The study described here, undertaken by RIVM at the request of, and in collaboration with the VROM Inspectorate, aimed to clarify and define this risk. The research team also tried to develop a risk profile for containers that possibly still contained gaseous pesticides, or which otherwise formed a health risk to those handling these containers (harmful gases, fumes, risk of explosion etc.).

2 Objectives of the study
The objectives of this study included:

a. supplying reliable information concerning the numbers of containers being imported into Rotterdam docks, which still contained remnants of gaseous pesticides;
b. drawing up a risk profile for containers being imported via Rotterdam docks and which may possibly still contain remnants of gaseous pesticides, any particular transport areas or particular cargos that are associated with finding remnants of gaseous pesticides in a container. Should a common denominator be found, a profile could be drawn up for containers with this increased risk level. Containers matching this profile could then be treated with more care in and around the docks, or perhaps even refused entry.

Apart from these two main objectives, the study included an additional objective, i.e.:

c. defining how successful field measuring equipment, sampling and laboratory analysis equipment were in detecting the presence of gaseous pesticides.

3 Set-up of the study

With regard to objective **a.** it was necessary to determine how many containers were imported annually through Rotterdam docks, so that a representative number could be randomly tested and analysed for types and concentrations of gaseous pesticides. Various measurement and sampling methods were used in order to achieve objective **c.** Of the containers selected for the representative random sample, as many details as possible were collated regarding origin, destination, type of cargo, any gas information given, etc., so that this information, together with analysis and measurement details, could be used to draw up a risk profile (objective **b.**).

4 Limitations within the study

The study included a number of limitations, such as the:

1. number of terminals to be included in the study;
2. maximum size of the random batch to be sampled and analysed;
3. selection of the containers to be included in the random test;
4. selection of the pesticides to be measured;
5. season and time span in which the random test was to be carried out;
6. practical implementation of the sampling;
7. selection of the sample measurement point;
8. analytical limitations.

The following section gives details of the (selected) limitations.

4.1 The number of terminals to be included in the study

The VROM Inspectorate has ascertained that 4 million containers are transported annually through Rotterdam docks (figures for the year 2000). Around 95% of these are handled in three terminals. Many small shipping companies handle the remaining 5%. The three large terminals were prepared to cooperate with the study. The random sample was therefore limited to the 95% of the import containers that are handled in these three terminals. The cost, and effort, of including the many small shipping companies in the study would have been disproportionate to the number of containers that they handle. The number of containers per terminal to be included in the study was defined pro rata, according to the volume of containers that each terminal handles.

4.2 The maximum size of the random test

In determining the size of the random sample, researchers also included the pre-condition that, if no risk containers were found then, in all probability, the percentage of risk containers is negligible. Translated into statistical terms, this means that in a random test of 300 containers, if no risk containers were found, then the percentage of risk containers over the entire total is 95% certain to be less than 1%. It was therefore decided that the random test should consist of 300 containers.

4.3 Selecting the containers to be included in the random test

The random test did not include refrigerated containers with cooled or frozen cargo, tank containers, open containers, or export containers. The reasons for excluding them from the random test were: pesticides are not used in these types of containers, and the brief from the VROM Inspectorate limited the study to health and safety, as well as environmental risks within the Netherlands.

Containers to be included in the random test were identified by the personnel in the relevant terminals. Selection was carried out by randomly picking containers from the shipping list, without identifying the type of freight being transported. However, the transport areas were identified. The random test included 55% from Asian origin, 2% from Africa, 32% from North and South America (including Canada), 11% from Europe and 1% from Oceania (including Australia).

4.4 Selecting the measurement parameters (pesticides, other gases)

Previous experience by the VROM Inspectorate shows that methyl bromide, formaldehyde and phosphine are the gases most often found in containers. It also appears that sulfuryl fluoride is being increasingly used. The study therefore, both for field measurements and laboratory analyses, was restricted to these four compounds. In addition, several other gases are regularly found in containers, not necessarily used as pesticides, but which can also form a health risk when handling these containers. These gases are ammonia, carbon dioxide and carbon monoxide. Measurements for these gases were carried out using field measurement equipment used for personal safety. New compounds are possibly also being used as pesticides in other countries, which are fairly unknown in the Netherlands. Samples were screened in the laboratory for compounds other than the aforementioned pesticides. Finally, all containers included in the test were measured for safety aspects, such as risk of explosion and oxygen levels.

4.5 Seasonal fluctuations and timeframe

It is possible that limiting this random test to a period of less than one year may introduce certain seasonal fluctuations, e.g. the absence of certain types of cargo, as the harvesting season falls outside the testing period. This should apply only to the use of phosphine, which is often used in bulk loads. The other types of pesticides seem to be used throughout the year, as previous experience shows that these pesticides are not restricted to certain types of cargo. It was therefore decided to conduct this random test during the course of one season and, after completion, to use shipping lists to check whether there could have been any seasonal fluctuation in the load, such as that concerning the use of one particular type of pesticide. Around 10 containers were measured and sampled each day.

4.6 Practical implementation of sampling

During the study it became clear that it was not possible to take samples from several containers. There were several reasons for this: measuring presented too high a risk of explosion in two containers, in several other cases the construction of the container doors or the method of loading the container was the impeding factor. Additional containers were measured instead of the aforementioned containers. Appendices 2A and 2B provide detailed descriptions of the sampling.

4.7 Selecting the sample measurement point

There was some expectation that gaseous pesticides that had been forced into the containers at one particular point would not be evenly spread over the contents of the containers. Methyl bromide, for example, is heavier than air and, if this were inserted into the container at floor level, would not be expected to rise to the topmost corners. Selecting the sample measurement point could therefore be crucial to the measurement results.

The concentration level of a pesticide in a container probably depends on the cargo in that container, the gas used, and the way in which this was inserted into the container. Considering the probable unpredictability of even distribution of the gaseous pesticides in a container, and the practical hindrances (time, money) involved in measuring and sampling 300 containers in minute detail, researchers decided that where possible measurements would be made via the container door (around 30 cm off the ground), followed by taking a sample from an accessible spot in the container, depending on the cargo.

A measurement point between the container doors was chosen as this is the location generally used by gas company employees when carrying out gas measurements in containers. The sample point inside the containers was chosen to provide a better opportunity for measuring the lower concentrations of pesticides, which may quickly dissipate when the container doors are opened.

4.8 Analytical limitations

A laboratory analysis method for determining phosphine levels was not available during the study. The phosphine levels could therefore only be measured using a sensor with an electrochemical cell. As phosphine is actually formed from a solid substance that reacts to humidity in the air, there was generally some evidence that containers had been treated with phosphine, in the form of packaging and remnants of the material (see Figure 1). This means that a positive measurement on the field equipment can be checked to see if phosphine is actually present or if the measurement results from the sensor's cross-sensivity to other components.

Figure 1: Example of packaging of phosphine-forming pesticides, found during the study

The analysis method for formaldehyde has a relatively high detection limit, which relates to the limited sampling period (10 minutes, see Appendix 2A). The sampling period was not extended, as this detection limit is well below MAC values for formaldehyde.

5 Implementing the study

5.1 Preparation

In preparation for this study the VROM Inspectorate obtained details of the total number of containers being imported annually through Rotterdam docks, the percentage of the various transport regions and the shipping companies that import containers into the Netherlands. This concerned information for the year 2000.

5.1.1 Calculating the size of the random test

Based on data available to the VROM Inspectorate concerning numbers of import containers etc., the size of the random test was determined, taking into account the levels of certainty required by the VROM Inspectorate concerning the degree of the gas-related container problem. Based on the results of this study, 95% certainty can be given regarding the percentage of import containers reaching the Netherlands that still contain remnants of gaseous pesticides.

5.1.2 Cooperation by terminal staff

Staff from three terminals cooperated with the study, known as terminals A, B, and C. The terminals selected containers at random during the study period, depending on the volume of containers that they normally handle. This meant 50 containers from terminal A, 100 from terminal B and 150 from terminal C. At least 10 containers per day were set aside in an inspection area for measurement and sampling. Once this was complete the shipping papers and other documentation for the sample containers were requested and partially obtained from the terminals and shipping companies.

5.2 Strategy of measuring and sampling

The following strategy for measuring and sampling was used each day. At least 10 randomly selected containers were placed in an inspection area, so that they were easily accessible and could be opened, if required. The work sequence, described below, was rarely changed, i.e.:

- check the codes on the containers and any directions, warning stickers, sealing codes etc.;
- carry out the gas measurements, from outside the container, using field equipment with display panel or colour-changing segment (see Section 5.5.1 for the method used to measure outside the container);
- if the reading was positive, a sample was taken from outside the container (see 5.5.1);
- if the reading was negative, the container was opened and a sample was taken from inside the container.

NB: as it was not possible to confirm field measurements at the time, all containers were opened so that, where possible, samples could be taken from the centre of the container. When opening the containers, staff wore personal protection apparatus, including independent breathing equipment and skin protection.

- visual inspection and registration of the type of cargo;
- after sampling, the containers were closed and sealed by the VROM Inspectorate;
- finally, information concerning the cargo was requested from the shipping company concerned.

5.3 Sampling period

During the periods 29 April to 17 May 2002 and 3 June to 24 June 2002, sampling took place on practically all working days. Appendix 5 lists all the data concerning the containers that were measured and sampled.

5.4 Field measurement equipment

The following field measuring equipment (that displayed the results immediately) was used during this study, to measure the pesticides formaldehyde, methyl bromide and phosphine, plus other important elements such as ammonia, carbon dioxide, carbon monoxide, risk of explosion and oxygen levels.

- Formaldehyde: detector tube, formaldehyde sensor, Chip Measurement System;
- Methyl bromide: detector tube;
- Phosphine: electrochemical cell;
- Ammonia: electrochemical cell;
- Carbon dioxide: electrochemical cell;
- Carbon monoxide: electrochemical cell;
- Explosion risk: catalytic cell;
- Oxygen levels: electrochemical cell.

Appendix 4 provides further information on the working principles of the field measurement equipment used.

5.5 Field work

Field measurements and sampling were registered on a sample registration form, as shown in Appendix 1.

5.5.1 Taking field measurements

A stainless steel capillary measurement probe was used to take the measurements, with a 'dead volume' of 100ml per metre probe. This is the amount of air already in the capillary and which is removed before measuring commences.
The probe was placed between the rubber seals on the container doors in order to measure inside the container. The other end of the probe was connected to the field measurement equipment (see Figure 2). The dead volume was pumped out before starting to measure the inside air.

Figure 2: Taking field measurements of a container
NB: For this container it was not possible to insert the probe between the rubber seal around the door at around 30 cm above ground.

5.5.2 Taking samples

The samples for this study were taken by:
- loading DNPH (dinitrophenylhydrazine) cartridges (formaldehyde analysis);
- filling Tedlar® air sample bags using the Vac-U-Tube™ (methyl bromide levels and unknown compounds). Both these items are products of SKC Inc., USA.

Appendices 2A and 2B give further details of the procedure for taking samples.

Once the container doors had been opened, samples were taken, where possible, by sucking air from the centre of the container over a cartridge and using the Vac-U-Tube to fill a Tedlar bag.

The samples were allocated a sample code that directly related to the container code. This sample code was immediately registered on the sample registration form used for that container.

5.5.3 Transporting the samples
The DNPH cartridges and the Tedlar bags were transported daily, as per standard guidelines, by the RIVM sampling team to the RIVM Laboratory for Organic Analytical Chemistry.

5.6 Analysing the samples
The DNPH cartridges were eluated with acetonitrile and the eluant was then analysed using HPLC (high performance liquid chromatography) with UV (ultraviolet) detector. Appendix 3A contains a detailed description of the sampling and analysis methods used.

The Tedlar bags were analysed within three days of receipt by the RIVM Laboratory for Organic Analytical Chemistry, using GC-MS (gas chromatography-mass spectrometry) techniques. Appendix 3B contains a detailed description of the methodology used.

6 Results
Appendix 5 depicts the results of the study in table form and includes the:
- sequence number of the container: each container with a unique container code was allocated a sequence number that bore no relation to the shipping company or terminal;
- date the sample was taken from each container;
- cargo in the container, where known: partially via visual inspection, otherwise gained from administrative information;
- origin of the container, where known: the container's country of origin was traced to Africa, Asia, America, Europe and Oceania (including Australia);
- results of the field measurements for methyl bromide, formaldehyde, phosphine, ammonia, carbon dioxide and carbon monoxide;
- results of laboratory analyses for sulfuryl fluoride, methyl bromide and formaldehyde.

7 Discussing the results

7.1 Number of containers sampled
A total of 303 containers were measured and sampled during this study. The origin of all the containers is known. The contents of 56 containers are not known, or are inaccurately described (e.g. the cargo is described as 'miscellaneous').

Only three containers displayed any kind of gas warning sticker: two of these had been painted over, and one sticker was in Chinese with an illustration of a skull (see Figure 3).

Figure 3: One of the gas warning stickers, as seen on containers included in this study

7.2 Laboratory analyses

In this study, the results of the validated laboratory analyses were decisive in determining the presence of gaseous pesticides (methyl bromide, formaldehyde and sulfuryl fluoride) in the sample containers.

At the time of the study there was no laboratory analysis method available for determining the presence of phosphine: finding the remnants of (packaging with) phosphine-forming pesticides was considered confirmation of a positive measurement.

Laboratory analyses could not confirm field measurements of ammonia, carbon dioxide and carbon monoxide, plus the risk of explosion and oxygen levels in the containers.

Table 1 shows a summary of the laboratory analyses results.
In the Netherlands, MAC values represent the maximum accepted concentration level of gas, fumes, spray or substance in the air at the workplace. In defining this value, the most important aspect is the fact that repeated exposure to this level of concentration, perhaps over a long period or even throughout a person's entire working life – as far as our current knowledge can ascertain – should generally not harm the employee's health, or that of his/her offspring.

Table 1: Results of laboratory analyses

Total number of containers	303		
Analysis parameter	**MeBr**	**CH_2O**	**SO_2F_2**
MAC value (ppm)	0.25	1.00	n.d.
Laboratory analysis results			
Positive result	19 (6%)	42 (14%)	0 (0%)
Result > MAC value	7 (2%)	3 (1%)	0 (0%)

MeBr = methyl bromide
CH_2O = formaldehyde
SO_2F_2= sulfuryl fluoride
n.d. = not determined

The contents of the Tedlar bags were also screened for other compounds that could possibly be used as pesticides, but such components were not found.

Laboratory analyses showed that:

- methyl bromide was found in 19 of the 303 containers, whereby the concentrations in seven containers exceeded the MAC values for methyl bromide;
- formaldehyde was found in 42 of the 303 containers, whereby the concentrations in three containers exceeded MAC values for formaldehyde;
- methyl bromide or formaldehyde was found in a total of 61 containers, i.e. 20% of all containers included in the study;
- both methyl bromide and formaldehyde were found in two containers, whereby concentration levels in one of these exceeded MAC values for these compounds;
- sulfuryl fluoride was not found in any of the containers.

7.3 Field measurements

Table 2 shows the results of the field measurements.
This Table also shows a comparison between the results of the field measurements and those of the laboratory analyses.

Table 2: Field measurements results, and comparisons between field measurements and laboratory analyses

Total number of containers	303								
Analysis parameter	**MeBr**	**CH_2O**	**SO_2F_2**	**PH_3**	**NH_3**	**CO_2**	**CO**	**Ex**	**Ox**
MAC value (ppm)	0.25	1.00	n.d.	0.3	20	5000	25	40%LEL CH_4 [1])	[2])
Field measurements									
Positive result	43	19	-	28	9	12	74	2	2
Result > MAC value	22	14	-	9	0	5	41	n.a.	n.a.
Comparison between field measurements/laboratory analyses									
False-positive field measurement	33	15	*	*	*	*	*	*	*
Confirmed field measurement	10	4	*	6[3]	*	*	*	*	*
False-negative field measurement	9	38	*	*	*	*	*	*	*

MeBr = methyl bromide
CH_2O = formaldehyde
SO_2F_2 = sulfuryl fluoride
PH_3 = phosphine
NH_3 = ammonia
CO_2 = carbon dioxide
CO = carbon monoxide
Ex = risk of explosion
Ox = oxygen levels
n.d. = not determined
- = not measured
* = cannot be compared as no laboratory analysis available
n.a.= not applicable

A field measurement result is considered:
- positive, if a measurement value greater than zero is shown on the measurement equipment;
- false positive, if the compound concerned was not found during the laboratory analysis;
- confirmed, if the compound concerned was also found during the laboratory analysis (whether or not in a similar concentration);
- false negative, if the field measurement was negative, but the laboratory analysis proved positive for the compound concerned.

7.3.1 Methyl bromide

The seven containers, in which methyl bromide concentrations were found to be greater than MAC values, also gave positive results (greater than MAC values) during the field measurements. It should be noted that, of the 33 false-positive measurements, 12 showed a colouring of the detector tube that differed from the usual methyl bromide colouring.

[1] Risk of explosion was measured as the concentration of flammable gases in the air, as a percentage of the lowest explosion level (LEL) of methane (CH_4) in air. A concentration of flammable gases in air measured as 40% (or more) LEL CH_4 consistitutes a risk of explosion.
[2] A dangerous situation exists if the oxygen levels are below 19% or higher than 23%.
[3] This confirmation was not due to the results of laboratory analysis, but is based on visual observations during sampling, of remnants (packaging) of phosphine-forming pesticides.

This may indicate interference due to the presence of compounds other than methyl bromide, but does not exclude the presence of methyl bromide.

The nine false-negative measurements for methyl bromide concerned concentrations below MAC values for methyl bromide. From a safety point of view, it seems that using detector tubes to measure methyl bromide is acceptable, as all seven containers with methyl bromide concentrations greater than MAC values were measured as such using field measurement. However, for concentrations below MAC values, considering the large differences with laboratory analyses, it appears that detector tubes are not a suitable measurement method.

7.3.2 Formaldehyde

Only four of the 19 containers that proved positive during field measurements for formaldehyde had this diagnosis confirmed by the laboratory analyses. This concerned two concentrations that were higher or equal to MAC values, and two concentrations that were below MAC values. The field measurements gave widely differing values, both higher and lower than the analysis measurements.

The field measurements gave false-positive readings for the other 15 containers. There were 38 false-negative measurements for formaldehyde, primarily using the CMS (Chip Measurement System). The formaldehyde sensor appears to be too strongly influenced by humid air, and regularly did not return to zero in clean air, which is why this instrument was no longer used after the first few days of the study. Detector tubes were occasionally used if the CMS displayed a defect, but were evaluated[1] in a previous study and therefore not used more often.

Using field measurement methods such as the CMS or the formaldehyde sensor is not acceptable from a field safety point of view: over 90% of the containers found positive for formaldehyde during laboratory analyses did not show positive using these field measurement methods.

7.3.3 Phosphine

Table 2 shows that six containers were found to contain visible remnants (packaging) of phosphine-forming pesticides. In one of these cases the laboratory analysis also showed the presence of methyl bromide. In five of these six containers the electrochemical cell showed phosphine concentrations varying from 0.2 ppm to over 20 ppm (MAC value for phosphine is 0.3 ppm). No phosphine was found in the air inside the sixth container, but phosphine plates were present that had not yet worn off. This container was not considered a false-negative measurement, as the atmosphere inside the container was such (dry) that, at that point in time, there was no phosphine in the air. However, the container should still be considered a risk because in damp air the remnants of the phosphine-forming agent would quickly release phosphine into the air.

[1] RIVM short report number 506/01 IEM/TK/tk

In summary, the phosphine sensor gave no false-negative readings, and 23 false-positive readings, when measuring 303 containers. It should be noted that, in the 23 containers now considered false positive, remnants (packaging) of phosphine-forming pesticides could have been present, out of sight, which therefore could not have been observed during the measuring and sampling process.

From a safety point of view, the sensor appears suitable for phosphine measurements, in combination with visual observations of any remnants of phosphine-forming pesticides. False-positive phosphine measurements greater than MAC values (four containers) also showed high concentrations of carbon monoxide. Cross-sensitivity is a possible cause.

7.3.4 Ammonia, carbon dioxide and carbon monoxide
Table 2 shows that ammonia was not measured in concentrations that exceeded MAC values. Carbon monoxide was found in 41 containers, in concentrations that exceeded MAC values (25 ppm). Carbon dioxide was found in five containers, in concentrations that exceeded MAC values. Carbon monoxide and carbon dioxide are not necessarily used as pesticides; these compounds can also be formed within the container's cargo, e.g. through oxidation. This, of course, does not reduce the risk of being exposed to concentrations that are greater than the MAC values. Using independent breathing apparatus is advisable if the MAC values for both carbon dioxide and carbon monoxide are exceeded.

It is not possible to compare the results of field measurements for ammonia, carbon dioxide and carbon monoxide with those of the laboratory analyses. This is because the sensors used and generally applied in the industry when measuring for personal safety reasons, assume a certain reliability of the measurements. It is well known that certain components can cause some cross-sensitivity of the sensors. The manufacturer has quantified this cross-sensitivity for the compounds most often concerned.

7.3.5 Risk of explosion/measuring oxygen levels
The risk of explosion and oxygen levels were measured in each container, using a single integrated instrument. Throughout the study two containers were found to constitute an explosion risk. One container was transporting cigarette lighters and included a warning sticker (Flammable Liquid) and the other contained computer monitors. The latter bore no warning stickers. A warning sticker on a container was considered, throughout this study, as an indication of a potentially risky container, which needed to be handled with even more care than usual.

Two containers with CO_2 levels that exceeded acceptable MAC values also contained oxygen levels of less than 19%: a good reason for personnel to wear independent breathing apparatus.

A direct comparison between field measurements and other measurement results is also not possible for ammonia, carbon dioxide and carbon monoxide. These measurements were carried out using industry-standard measuring equipment that is calibrated every six months.

7.4 Risk containers

Table 3 shows an overview of the number of containers that formed a risk on opening them, due to the:

- presence of methyl bromide, formaldehyde or sulfuryl fluoride in concentrations that exceeded MAC values (determined via laboratory analyses), or
- presence of remnants of phosphine-forming pesticides (determined through visual observation), or
- presence of ammonia, carbon dioxide or carbon monoxide that exceeded MAC values (determined by field measurements), or
- risk of explosion, or
- too high, or too low, oxygen levels.

These containers are known as risk containers.
Opening these containers, or handling their cargo, requires extra safety precautions to be enforced, to prevent personnel being subjected to these risks.

Table 3: Risk containers, in numbers and percentages of the total number of containers sampled

Total number of containers	303								
Risk factor	**MeBr**	**CH_2O**	**SO_2F_2**	**PH_3**	**NH_3**	**CO_2**	**CO**	**Ex**	**Ox**
MAC value (ppm)	0.25	1.00	n.d.	0.3	20	5000	25	40%LEL CH_4 [1])	[2])
Number of risk containers	7	3	0	6	0	5	41	2	2
Risk containers with regard to pesticides[3]	14 (5%)								
Risk containers with regard to other parameters[4]	45 (15%)								
Risk containers with regard to pesticides and other parameters	1 (0.3%)								
Total number of risk containers	60 [5] (20%)								

MeBr = methyl bromide
CH_2O = formaldehyde
SO_2F_2 = sulfuryl fluoride
PH_3 = phosphine
NH_3 = ammonia
CO_2 = carbon dioxide
CO = carbon monoxide
Ex = risk of explosion
Ox = oxygen levels
n.d. = not determined
- = not measured
* = no comparison possible between field measurements and laboratory analyses
n.a. = not applicable

It should be noted that the information depicted in Table 3 is based on a single measurement point per container. It is possible that taking measurements from several points in a container would result in higher pesticide levels being measured, or the presence of pesticides being confirmed. However, the containers included in Table 3 certainly confirm that a risk situation existed for at least one measurement point per container.

[1] risk of explosion was measured as the concentration of flammable gases in the air, as a percentage of the lowest explosion level (LEL) of methane (CH_4) in air. A concentration of flammable gases in air measured as 40% (or more) LEL CH_4 constitutes a risk of explosion.
[2] A dangerous sitation exists if the oxygen levels are below 19% or higher than 23%.
[3] Pesticides refer to: methyl bromide, formaldehyde, sulfuryl fluoride and phosphine.
[4] Other parameters refer to: ammonia, carbon dioxide, carbon monoxide, risk of explosion and oxygen levels.
[5] The total number of risk containers is lower than the sum of the, per parameter specified, number of risk containers. This is due to an overlap of risk factors: for example, some containers showed both a too-low oxygen level as well as a concentration of carbon monoxide that exceeded MAC values.

7.5 Transport areas

Table 4 shows the origins and transport areas of the 303 containers included in this study. The number of containers found positive for methyl bromide, formaldehyde or phosphine-forming pesticides is also shown per transport area. Figure 4 shows a graph of these results, with the associated 90% reliability intervals.

Table 4: Origins of the containers

Transport area	Number of containers	MeBr	CH_2O	PH_3	Total positive
Africa	5	0	1	0	1
Asia	166	10	18	3	28[1]
America	96	3	21	3	27
Europe	33	6	1	0	7
Oceania	3	0	1	0	1
Total	303				64[1]

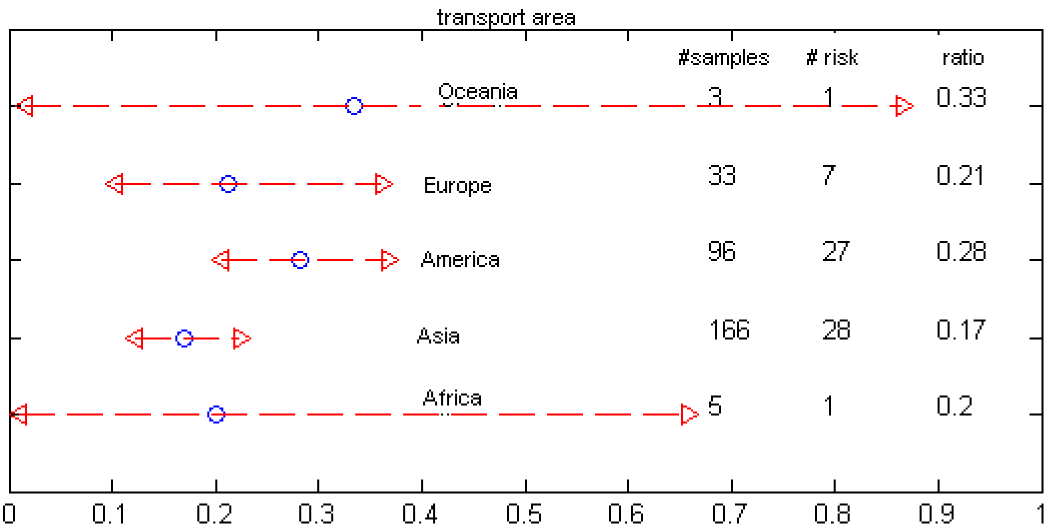


Figure 4: Number of positive containers in relation to the total number of sampled containers per transport area. The ratios are shown as blue circles and the associated 90% reliability intervals are shown as red dotted lines

Table 4 (and Figure 4) show that there is little difference between the percentages of positive containers per transport area. This conclusion is further supported when taking account of the uncertainty in the estimated percentages. Apart from a number of practical limitations, as mentioned in Chapter 4, this random sample was designed to show as representative an overview as possible of the import containers passing through Rotterdam. The minor differences shown between the ratios of the various transport areas

[1] A combination of pesticides was found in three containers: two contained methyl bromide and formaldehyde, and one contained methyl bromide and phosphine.

indicate that there is probably little efficiency to be gained by using a more focused search profile.

7.6 Cargo in the containers

Cargo information was requested for all the containers included in the study. This showed that even fairly safe types of cargo can involve unexpected risks, e.g. as with container number 233 (see Appendix 5: Results of the study). This container transported a batch of computer monitors, but also very high concentrations of butane and pentane, which resulted in a risk of explosion.

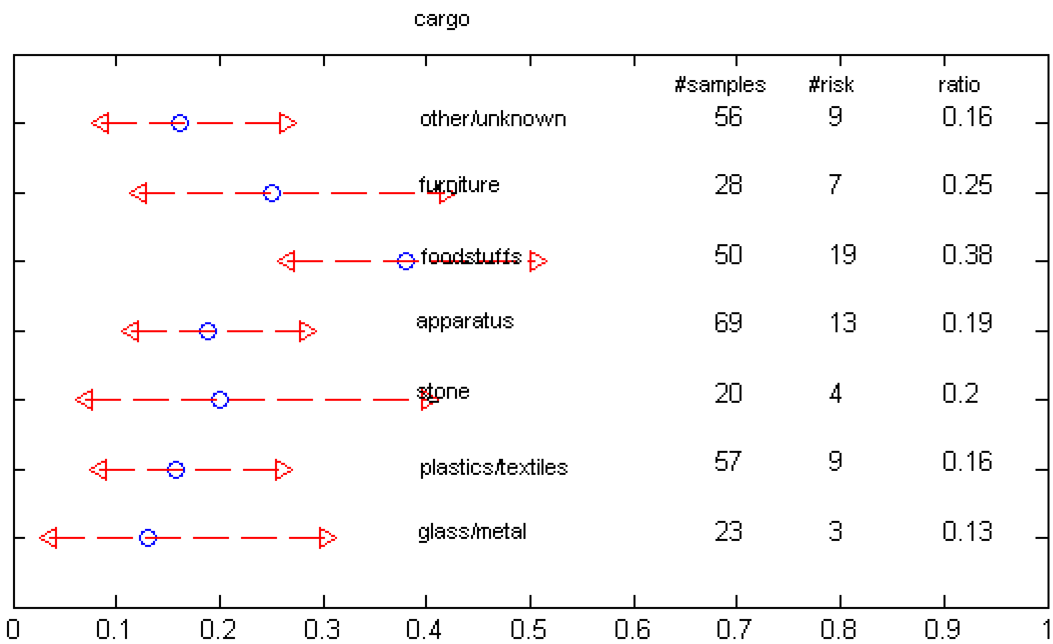


Figure 5: Number of positive containers in relation to the total number of containers sampled, per cargo category. The ratios are shown as blue circles and the associated 90% reliability intervals are shown as red dotted lines

The cargos were divided into various categories to determine whether it would be more efficient to study a particular type of cargo. These categories were chosen to give the clearest possible definition of the cargo, while ensuring that there were at least several tens of containers per category. Figure 5 shows the results. The number of positive containers in most categories is less than 20%, apart from furniture and, in particular, foodstuffs. For furniture, the percentage difference compared to other categories is so small as to be insignificant, and could also result from the size of the random test. To see whether it would be beneficial to search for containers of foodstuffs, Figure 6 shows all categories (apart from unknown and other) as food or non-food. Figure 6 clearly shows that the percentage of positive containers is significantly higher for foodstuffs than for all the other categories put together. This indicates that the percentage of positive containers would be approximately doubled if a search profile were used that particularly focused on containers transporting foodstuffs.

There is a much clearer differentiation shown for the pesticide phosphine. This was found in six containers of foodstuffs, but not in any of the containers in the remaining categories (Figure 7).

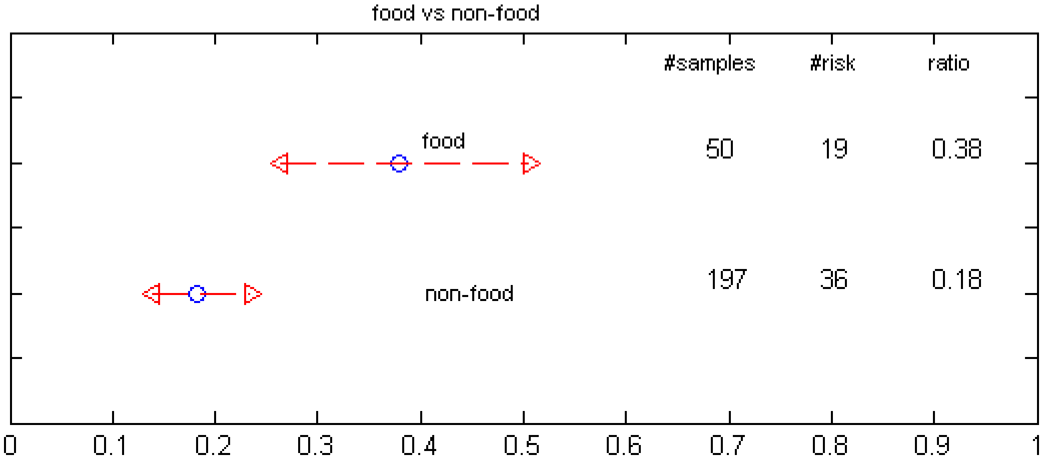


Figure 6: Number of positive containers in relation to the total number of containers sampled for foodstuffs, compared to the containers in other categories. The ratios are shown as blue circles and the associated 90% reliability intervals are shown as red dotted lines

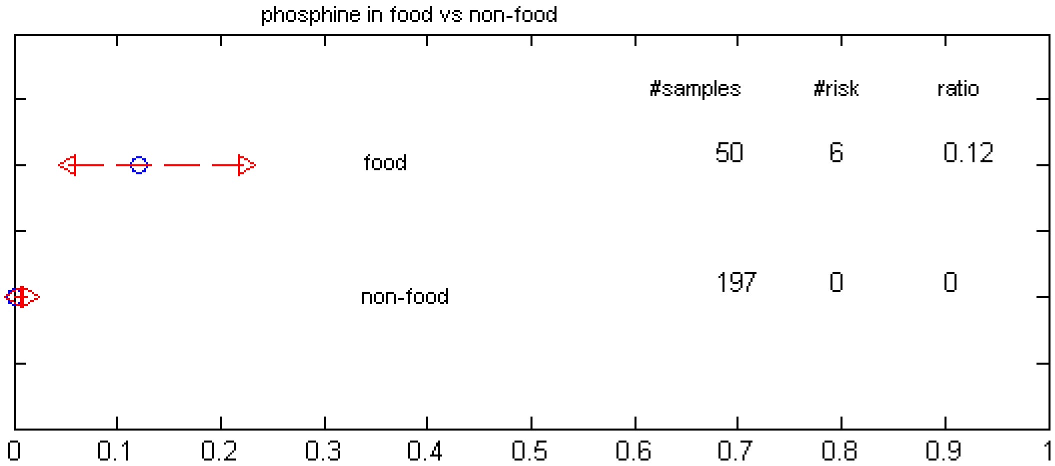


Figure 7: Number of containers that proved positive for the pesticide phosphine in relation to the total number of containers sampled for foodstuff containers, compared to the containers in other categories. The ratios are shown as blue circles and the associated 90% reliability intervals are shown as red dotted lines

7.7 Terminals

The 303 containers were selected from three terminals. Table 5 shows how many containers, per terminal, were included in the study. The terminals are not named, to protect corporate information, but are identified using a letter code (A, B, C). The Table also shows the number of containers per terminal that were found to contain methyl bromide, formaldehyde or phosphine.

Table 5: Containers per terminal and the pesticides found

Terminal	Number of containers	MeBr	CH_2O	PH_3	Total
A	107	9	21	2	30[1]
B	148	10	12	1	22[1]
C	48	0	9	3	12
Total	303				64

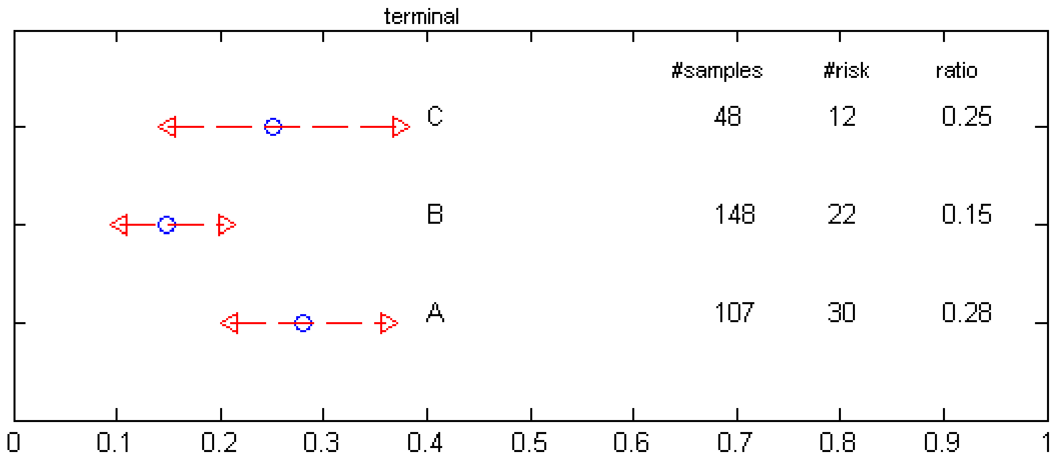


Figure 8: Number of positive containers in relation to the total number of container sampled for the three terminals. The ratios are shown as blue circles and the associated 90% reliability intervals are shown as red dotted lines

Figure 8 shows the percentages of positive containers per terminal. There is a clear difference between terminal A and terminal B. This is not caused by differences in the percentages of foodstuff containers, as this percentage for terminal B (18%) is larger than for terminal A (13%). As yet there is no explanation for this discrepancy.

[1] NB: one container from terminal A was found to contain methyl bromide and phosphine, while one container from terminal A and one from terminal B were found to contain both methyl bromide and formaldehyde.

8 Conclusions

1. Pesticides found in containers:

One of the two main objectives of this study was to supply reliable statistics concerning the number of containers handled in the Rotterdam docks that still contained (remnants of) gaseous pesticides. The results of this study showed that:

- 21% of the containers sampled contained methyl bromide, formaldehyde or phosphine;
- 5% of the containers sampled constituted a risk due to concentrations of methyl bromide and/or formaldehyde, or phosphine-forming pesticides that exceeded MAC values;
- none of the containers sampled was found to contain sulfuryl fluoride.

Assuming that this study included a representative sample of the 4 million containers that pass through Rotterdam each year, the study concludes with 95% certainty that 200,000 containers are imported annually via Rotterdam which form a risk to the health and safety of those handling these containers or working in their vicinity, as a result of the pesticides that they (still) contain.

2. Other risk factors

A number of risk factors are not necessarily connected to the fact that the containers are treated with pesticides, but can be caused by the type of cargo and the fact that containers are, by definition, sealed units. These risk factors include oxygen levels, risk of explosion, carbon dioxide and carbon monoxide concentrations in a container. This study also encompassed a number of other types of risk that could be important to the health and safety of those handling these containers (examining, checking, loading, unloading), particularly where concentrations of carbon dioxide, carbon monoxide, ammonia and oxygen levels, as well as the risk of explosion, are concerned.
The results show:

- 15% of the containers sampled formed some kind of risk, based on these parameters[1].

Assuming that this was a representative sample of the 4 million containers annually transported through Rotterdam docks, the study concludes with 95% certainty that around 600,000 containers pass through Rotterdam each year, which form a risk to the health and safety of everyone handling these containers or working in their vicinity, as a result of oxygen and ammonia levels, carbon dioxide/monoxide levels or the risk of explosion.

3. Risk containers

The results of the study show with 95% certainty that 800,000 containers pass through Rotterdam annually, which form a risk to the health and safety of those handling the containers or working in their vicinity, due to the presence of pesticides or other parameters.

[1] Exceeding MAC values for ammonia, carbon dioxide, carbon monoxide, oxygen levels lower than 19% or higher than 23%, or a risk of explosion (concentrations of flammable gases in air, measured as a percentage of the LEL of methane in air).

4. Risk profile
As much information as possible was registered concerning the containers sampled in order to assist the development of a risk profile. The study showed that the outer surface of the containers usually included no identification, other than a container code. Labelling was a rare occurrence. Other registered characteristics of the containers included: transport area, terminal and cargo.

The study showed that, by using a sample profile that focused more on containers shipping foodstuffs, the number of containers found to contain gaseous pesticides would probably double.

5. Instructions on the outside of the container
Three of the 303 containers sampled included some kind of warning sign (placard, sticker) concerning the contents of the container. Only one of these was clearly readable and understandable. The outside of the containers rarely provided information concerning possible risks.

As it was not possible to differentiate between ‘innocent’ and risk containers, all containers had to be treated with equal care, however innocent the cargo may appear.

6. Field measurements
Apart from general factors, such as cross-sensitivity for other components and influence from environmental factors (temperature, humidity), the results of field measurements made during this study may also differ from laboratory analyses methods, due to the accessibility of the container and the non-uniform distribution of the gaseous pesticides within the container.

Accessibility of the container played a role in confirming positive field measurements of phosphine. If phosphine-forming pesticides were not visible, e.g. at the back of the container, then these could not be observed, whereby a positive field measurement was evaluated as a false-positive measurement. The difference in field measurement and sample point could, for non-uniform distribution of gaseous pesticides over the inside of the container, have resulted in false-positive or false-negative field measurements of methyl bromide and formaldehyde.

Despite this, methyl bromide measurements using detector tubes proved positive for concentrations exceeding MAC values, and false-negative measurements were limited to concentrations below MAC values.

For formaldehyde, the sensor proved to be an unsuitable field measurement method due to the strong influence of humidity on the readings. This meant that the instrument could not be used for increasingly longer periods. The CMS method of measuring formaldehyde was just as unreliable: it missed 90% of the containers found positive (42 containers).

Sixty percent of the phosphine measurements that exceeded MAC values were confirmed through observing remnants of phosphine-forming pesticides. The other measurements could have been false positive.

From a safety point of view, detector tubes seem acceptable for detecting methyl bromide, as well as using electrochemical cells for phosphine measurement, but using the formaldehyde sensor or CMS to measure formaldehyde levels is not recommended.

9 Recommendations

This study has shown that the outside of a container provides no information concerning the possible risks concerning its cargo. It is therefore recommended that when handling containers:
- measurements should always be carried out regarding risk of explosion and oxygen levels;
- personnel should always be prepared for the presence of gaseous pesticides and should always carry out field measurements;
- safety regulations should be set beforehand, concerning the presence of gaseous pesticides and other risks such as that of explosion or too low oxygen levels.

The reliability of the phosphine measurements using the electrochemical cell should be studied further by comparing it with other field measurement methods for phosphine.

Formaldehyde was found in a large number of containers during this study. However, there is currently no adequate method of field measurement. A suitable and reliable method needs to be developed as soon as possible.

The study team recommends that detector tubes for methyl bromide measurements be optimised, so that fewer false-negative readings are given.

There is currently no field measurement method for sulfuryl fluoride. A detector tube is being developed but, as yet, no information has been given regarding its selectivity and sensitivity, or when it will become commercially available. Development of this tube is very valuable, as the VROM Inspectorate have the impression that sulfuryl fluoride will be used more often in the future.

Study into the uniformity of the gaseous concentrations inside a container could provide more information regarding the distribution of these compounds within the container. This could, in turn, lead to more sample points being used for measurements, before a gas-free statement is issued.

Indicating risk containers by placing some kind of sticker on the outside was a rare occurrence. International organisations should ensure that the regulations with respect to ‘hazard labels’ are complied with more fully.

The study highlighted the fact that pesticides such as methyl bromide can form an additional risk in textile products. The gases actually penetrate these products and are released, over a period of time, into the air. This could mean that consumers may come into contact with these gaseous pesticides. There is currently little information concerning the behaviour of gaseous pesticides in products transported in sealed containers. It is recommended that further study be carried out into this aspect.

10 Incident reports during the study

During this study a number of incidents were reported concerning containers. It is worth noting, within the framework of this study, that a container shipment of bathroom slippers caused a member of staff to be ill, as a result of being exposed to ammonia. Laboratory analyses later revealed that an ammonia concentration of over 700 ppm (MAC value: 20 ppm) and a toluene concentration of 48 ppm (MAC value: 40 ppm) were present in the container.

This incident with an unlabelled container, with an apparently innocent cargo, shows once again that every container should be considered a potential risk, until field measurements prove otherwise.

Appendix 1: Example sample registration form

SAMPLE REGISTRATION FORM
GASES IN IMPORT CONTAINERS

Date:	
Location:	
Container code:	
Seal code (old)	Seal code (new)
Shipping company:	
Origin of the container:	
Destination of the container:	
Contents of the container:	
Gas warning sticker present?	
If so, for which gas?	
Comments	

SAMPLE REGISTRATION FORM
GASES IN IMPORT CONTAINERS

Container code:

Measurement

Type of measure-ment	Location (door or inside)	Formal-dehyde (ppm)	Methyl bromide (ppm)	Phosphine (ppm)	Other

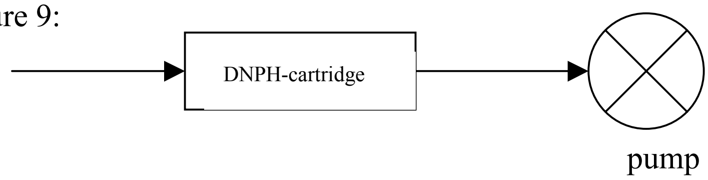
Sampling

Location (door or inside)	Medium (cartridge or bag)	Sample code	Start time	Stop time	Flow (ml/min)

Appendix 2A: Taking samples using DNPH cartridges

It is difficult to take samples of formaldehyde in air, due to the high reactiveness of formaldehyde, whereby other compounds are quickly formed, i.e. other than formaldehyde. This is why formaldehyde in air is therefore fed over so-called DNPH cartridges to trap the formaldehyde, where it then reacts with DNPH (dinitrophenylhydrazine) into a derivative that is stable and relatively easy to analyse (see Appendix 3A). Figure 9 shows how samples of formaldehyde were taken using the DNPH cartridges.

Figure 9:

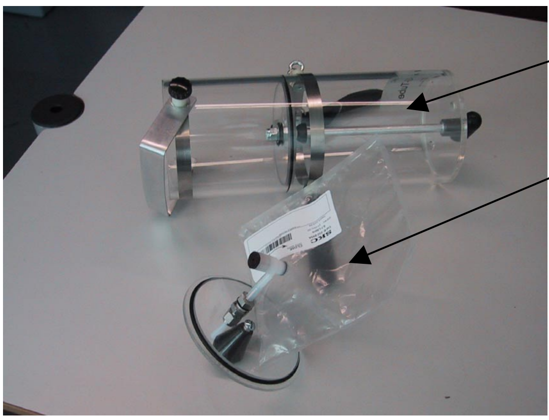


The procedure is as follows:
- the pump is set up for a known flow of around 100 ml/min.
- the cartridge is coupled (in the correct flow direction) to the pump via a hose.
- the other side of the cartridge is placed in the atmosphere to be sampled.
- the pump sucks out air via the cartridge for a set period (around 10 minutes).
- after switching off the pump the sampling period is registered on the sample registration form and the cartridge is sealed at both ends using the plugs provided.
- the cartridge is then cooled (7°C) and stored at this temperature until it is analysed.

Appendix 2B: Taking samples in Tedlar bags using the Vac-U-Tube

Figure 10 shows an illustration of the Vac-U-Tube.

Figure 10:



The Vac-U-Tube works as follows:
The cylinder in the Vac-U-Tube contains an empty Tedlar bag. A plunger is used to create a vacuum in the cylinder, whereby the Tedlar bag expands, and fills with air from the atmosphere to be sampled.
The Tedlar bag is then sealed and removed from the cylinder.
The Tedlar bag is then allocated a sample code and transported, at ambient temperature, to the laboratory for analysis.

Appendix 3A: Analysing formaldehyde

When analysing formaldehyde and acetaldehyde in air, around 10 litres of air are fed through a special Solid-Phase-Extraction cartridge, which contains 200 mg silica-bound C18 material and is loaded with the reagent DNPH (dinitrophenylhydrazine). During the sampling the aldehydes are converted into their corresponding DNPH derivatives and trapped within the cartridge.

The DNPH derivatives of formaldehyde and acetaldehyde that are formed are then eluated with 2 ml acetonitrile from the cartridge. The acetonitrile solution is partially mixed with water (2:3) and the solution is analysed with an HPLC-UV instrument. The components are hereby separated on a reversed-phase C18 analytic column using an acatonitrile-water-gradient eluant, and then detected and quantified at a wavelength of 360 nm.

Appendix 3B: Analysing Vikane™, methyl bromide and unknown compounds

Sulfuryl fluoride (Vikane, a product of Dow AgroSciences LLC) and methyl bromide are analysed by taking an air sample from a 50 ml Tedlar bag and placing it in a gas chromatograph with a mass spectrometer. Here the sample is separated on a capillary column in the gas chromatograph and detected with a mass spectrometer in electron impact mode. The full scan range is 29-300 m/z. Quantification is carried out using a 0.5 ppm Vikane and methyl bromide standard in a Tedlar bag.

The other components were identified via the NIST reference library (120,000 components) and the AMDIS (Automated Mass Spectral Deconvolution and Identification System) deconvolution technique.

Appendix 4: Field equipment used

- Detector tubes

Detector tubes work on the colouring principle. The compound to be detected gives a colour reaction to the substance(s) in the detector tube, and the intensity of that colour change is a measure of the concentration of this compound in the air sample. During this study detector tubes were used to measure methyl bromide. However, this compound has a certain cross-sensitivity, whereby colouring can occur due to the presence of other compounds in the air, apart from methyl bromide. This colouring can, but does not necessarily, differ from the usual colouring resulting from the presence of methyl bromide.

- CMS (Chip Measurement System)

The CMS system is based on the chemical reaction of the sample gas (in this case, formaldehyde) with a suitable reagent system. This reagent system is quantified and defined, and placed in a sealed glass capillary (chip). After opening the capillary, the air sample is sucked through the reagent system at a constant flow. The development of the chemical reaction is detected optoelectronically and evaluated to a measurement value, which is then shown as a concentration level on the display.

- Electrochemical cell

In an electrochemical cell, molecules from the sample compound generate an electromotive force that is equal to the concentration of this compound in air. Depending on the compound to be detected, the specific electrochemical cell is more, or less, sensitive to interference from other compounds.

- Explosion/Oxygen level measurements

To ensure personal safety, an explosion/oxygen level meter was used during the study, whereby the air inside the containers was measured from outside the containers, for concentrations of flammable gases (catalytic cell) and oxygen levels (electrochemical cell).

- Formaldehyde sensor

An infrared formaldehyde sensor was used during this study. Formaldehyde absorbs infrared light at a certain wavelength. However, adsorption of other compounds also occurs around this wavelength, so the sensor was not considered particularly accurate, due to this sensitivity to interference. During the course of the study the use of the sensor was abandoned as it was clearly giving unreliable readings.

Appendix 5: Results of the study

Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm) lab.	MeBr (ppm) field	MeBr (ppm) lab.	CH2O (ppm) field	CH2O (ppm) lab.	PH3 (ppm) field	Com-ments	NH3 (ppm) field	CO2 (ppm) field	CO (ppm) field
1	C	29-04-02	unknown	miscellaneous	0	<DL	0	<DL	-	<DL	0		0	0	0
2	C	29-04-02	metal	xmas decoration	1	<DL	0	<DL	-	<DL	0		0	0	0
3	C	29-04-02	stone	soil	3	<DL	0	<DL	-	<DL	0		0	0	0
4	C	29-04-02	stone	rubble	3	<DL	0	<DL	-	<DL	0		0	0	0
5	C	29-04-02	unknown	boxes	1	<DL	0	<DL	-	<DL	0		0	0	0
6	C	29-04-02	stone	tiles	3	<DL	0	<DL	**21.5**	<DL	0		0	0	0
7	C	29-04-02	app.	kitchen décor.	1	<DL	0	<DL	0	<DL	0		0	0	0
8	C	29-04-02	furnit.	cane chairs	1	<DL	0	<DL	**10/0.5**	**0.67**	0				
9	C	29-04-02	unknown	?	2	<DL	0	<DL	**1**	<DL	0		0	0	0
10	C	30-04-02	stone	granite tiles	3	<DL	0	<DL	**14**	<DL	0		0	**5000**	0
11	C	30-04-02	food	coffee - bulk	0	<DL	0	<DL	0	<DL	0		0	0	0
12	C	30-04-02	stone	snails	1	<DL	0	<DL	0	<DL	0		0	0	0
13	C	30-04-02	food	raisins	2	<DL	0	<DL	-	<DL	**4**	rest PH3	**15**	**1900**	**90**
14	C	30-04-02	furnit.	cotton pulp	0	<DL	0	<DL	-	<DL	0		0	0	**2**
15	C	30-04-02	furnit.	removals equip	4	<DL	0	<DL	**10**	**0.14**	0		0	0	0
16	C	30-04-02	food	coffee drinks	2	<DL	0	<DL	**6**	<DL	0		0	0	0
17	C	30-04-02	metal	aluminium foil	2	<DL	0	<DL	**5**	<DL	0		0	0	0
18	C	30-04-02	food	bottles of wine	3	<DL	0	<DL	0	**0.33**	0		0	0	0
19	C	02-05-02	unknown	boxes	1	<DL	0	<DL	-	**0.17**	0		0	0	0
20	C	02-05-02	unknown	crates	1	<DL	0	<DL	0	<DL	0		0	0	0
21	C	02-05-02	app.	cig.lighters	1	**removed due to risk of explosion**									
22	C	02-05-02	metal	alumi.powder	1	<DL	0	<DL	0	<DL	0		0	0	0
23	C	02-05-02	unknown	sacks white powd	2	<DL	0	<DL	0	<DL	**0.15**		0	0	**14**
24	C	02-05-02	furnit.	removals equip	2	<DL	0	<DL	0	<DL	0		0	0	0
25	C	02-05-02	unknown	miscellaneous	1	<DL	0	<DL	**>>>>>>**	<DL	0		0	0	**140**
26	C	02-05-02	synth.	games	1	<DL	0	<DL	0	<DL	0		0	0	**40**
27	C	02-05-02	synth.	polymer granules	1	<DL	0	<DL	0	<DL	0		0	0	0

(pink)	= risk container
?	= unknown
orig.	= origin
0	= orig. Africa
1	= orig. Asia
2	= orig. America
3	= orig. Europe
4	= orig. Oceania (incl.Australia)

unknown = unknown, misc. or other
furnit = furniture, woodwork
food = solid, liquid, bulk, packed
app = appliances, electronics
stone = soil, stone, earthenware
synth. = plastics, textiles, paper
metal = metal, glass
DL = detection limit

Seq.nr.	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
28	C	02-05-02	unknown	boxes	1	<DL	0	<DL		<DL	0		0	0	0
29	C	03-05-02	food	banana puree	2	<DL	0	<DL	0	0.17	0		0	0	0
30	C	03-05-02	unknown	?	4	<DL	0	<DL	0	<DL	0		0	0	0
31	C	03-05-02	furnit.	removals equip	4	<DL	0	<DL	0	<DL	0		0	0	0
32	C	03-05-02	unknown	miscellaneous	0	<DL	0	<DL	0	0.33	0		0	0	0
33	C	03-05-02	synth.	post/packages	1	<DL	0	<DL	0	<DL	0		0	0	0
34	C	03-05-02	unknown	recycling mat.	2	<DL	0	<DL	0	0.17	0.12		0	0	0
35	C	03-05-02	stone	tiles	2	<DL	0	<DL	0	<DL	0		0	0	27
36	C	03-05-02	unknown	miscellaneous	0	<DL	0	<DL	0	<DL	0		0	0	0
37	C	03-05-02	food	peanuts	2	<DL	0	<DL	0	<DL	0		0	0	0
38	C	03-05-02	unknown	groupage(misc)	2	<DL	0	<DL	0	0.18	0		0	0	0
39	C	07-05-02	metal	bolts	1	<DL	0	<DL	0.41	13.4	0		0	0	4
40	C	07-05-02	unknown	miscellaneous	2	<DL	0.5	<DL	0	<DL	0		0	0	0
41	C	07-05-02	food	peanuts	2	<DL	0	<DL	0	<DL	0.2	rest PH3	0	0	0
42	C	07-05-02	food	butter	1	<DL	0	<DL	0	<DL	0		0	0	0
43	C	07-05-02	food	butter	1	<DL	0	<DL	0	<DL	0		0	0	4
44	C	07-05-02	app.	insect lamps	1	<DL	0	<DL	0	<DL	0		0	0	0
45	C	07-05-02	furnit.	coat racks	1	<DL	0	<DL	0	<DL	0		0	0	0
46	C	07-05-02	food	peanuts	2	<DL	0	<DL	0	<DL	0.7	rest PH3	0	0	10
47	C	07-05-02	stone	ore	1	<DL	0	<DL		<DL	0		0	0	0
48	C	07-05-02	metal	glassware	1	<DL	>0.5	<DL	0	<DL	0		0	0	0
49	A	13-05-02	app.	cables	2	<DL	0	<DL	0	<DL	0		0	0	0
50	A	13-05-02	synth.	synthetic resins	2	<DL	0	0.08	0	<DL	0		0	0	0
51	A	13-05-02	stone	lawn&ground	2	<DL	0	<DL	0	<DL	0		0	0	0
52	A	13-05-02	synth.	paper	2	<DL	0	<DL	0	<DL	0		0	0	0
53	A	13-05-02	food	antibiotics	2	<DL	0.1-0.2	0.01	0	<DL	0		0	0	0
54	A	13-05-02	synth.	postal items	2	<DL	0	<DL	0	0.49	0		0	0	0
55	A	13-05-02	food	starch	2	<DL	0	<DL	0	<DL	0		0	0	0
56	A	13-05-02	app.	cables	2	<DL	0	<DL	0	<DL	0		0	0	15

(pink)	= risk container
?	= unknown
orig.	= origin
0	= orig. Africa
1	= orig. Asia
2	= orig. America
3	= orig. Europe
4	= orig. Oceania (incl.Australia)

unknown = unknown, misc. or other
furnit. = furniture, woodwork
food = solid, liquid, bulk, packed
app = appliances, electronics
stone = soil, stone, earthenware
synth. = plastics, textiles, paper
metal = metal, glass
DL = detection limit

Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
57	A	13-05-02	app.	medical suppl.	2	<DL	0	<DL	0	<DL	0		0	0	0
58	A	14-05-02	app.	alumin.anodes	2	<DL	0	<DL	0	0.23	0		0	0	0
59	A	14-05-02	app.	machines	2	<DL	0.5	<DL	0	0.21	0		0	0	0
60	A	14-05-02	app.	oil pump parts	2	<DL	0	<DL	0	0.17	0		0	0	0
61	A	14-05-02	food	foodstuffs	2	<DL	0	<DL	0	0.18	0		0	0	10
62	A	14-05-02	food	foodstuffs	2	<DL	0	<DL	0	0.15	0		0	0	0
63	A	14-05-02	food	foodstuffs	2	<DL	0	<DL	0	0.25	0		0	0	0
64	A	14-05-02	app.	oil pump parts	2	<DL	0	<DL	0	0.19	0		0	0	0
65	A	14-05-02	app.	oil pump parts	2	<DL	0.5	<DL	0	0.23	0		0	0	0
66	A	14-05-02	food	peanuts	2	<DL	0	<DL	0	0.18	0		0	0	0
67	A	14-05-02	food	foodstuffs	2	<DL	0	<DL	0	0.29	0		0	0	0
68	A	14-05-02	food	foodstuffs	2	<DL	0.3	<DL	0	0.2	0		0	0	0
69	A	15-05-02	synth.	car tyres	1	<DL	0	<DL	0	0.18	0		0	0	0
70	A	15-05-02	food	pineapple juice	1	<DL	0	<DL	0	<DL	0		0	0	0
71	A	15-05-02	app.	machine parts	1	<DL	0	<DL	0	0.74	0.15		0	0	10
72	A	15-05-02	synth.	car tyres	1	<DL	0	<DL	0	<DL	0		0	0	0
73	A	15-05-02	synth.	toner	1	<DL	0	<DL	0	0.2	0		0	0	0
74	A	15-05-02	app.	airco's	1	<DL	0	<DL	0	0.18	0		0	0	0
75	A	15-05-02	app.	air freshener	1	<DL	0	<DL	0	0.14	0		0	0	0
76	A	15-05-02	app.	photogr. items	1	<DL	0	<DL	0	0.28	0		0	0	0
77	A	15-05-02	app.	photogr.items	1	<DL	0	<DL	0	0.34	0		0	0	0
78	A	15-05-02	app.	photogr.items	1	<DL	0	<DL	0	<DL	0		0	0	0
79	A	16-05-02	food	sauces	1	<DL	0	<DL	0	<DL	0		0	0	0
80	A	16-05-02	app.	microwaves	1	<DL	0	<DL	0	<DL	0		0	0	25
81	A	16-05-02	app.	car parts	1	<DL	0	<DL	0	<DL	0		0	0	0
82	A	16-05-02	unknown	general	1	<DL	0	<DL	0	<DL	0		0	0	0
83	A	16-05-02	synth.	floor coverings	1	<DL	0	<DL	0	<DL	0		0	0	0
84	A	16-05-02	furnit.	furniture	1	<DL	0	<DL	0	<DL	0		0	0	0
85	A	16-05-02	food	sauces	1	<DL	0	<DL	0	<DL	0		0	0	0
86	A	16-05-02	app.	electrical goods	1	<DL	0	<DL	0	<DL	0		0	0	0
87	A	16-05-02	synth.	textiles	1	<DL	0	<DL	0	<DL	0		0	0	0

	= risk container
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unknown = unknown, misc. or other
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metal = metal, glass
DL = detection limit

Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm) lab.	MeBr (ppm) field	MeBr (ppm) lab.	CH2O (ppm) field	CH2O (ppm) lab.	PH3 (ppm) field	Com-ments	NH3 (ppm) field	CO2 (ppm) field	CO (ppm) field
88	A	16-05-02	unknown	general	1	<DL	0	<DL	0	<DL	0			0	0
89	A	16-05-02	furnit.	alumin.beds	1	<DL	0	<DL	xxxx	<DL	0		0	0	0
90	A	17-05-02	food	herbs	1	<DL	0.5	0.2	0	<DL	>20	rest PH3			
91	A	17-05-02	app.	fixings	1	<DL	0	<DL	0	<DL	0		0	0	0
92	A	17-05-02	app.	microwaves	1	<DL	0.2	<DL	0	<DL	0		0	0	0
93	A	17-05-02	synth.	threads	1	<DL	0	<DL	1.05	<DL	0		0	0	0
94	A	17-05-02	synth.	pol.threads	1	<DL	0	<DL	>5	<DL	0		3	0	0
95	A	17-05-02	app.	refrigerators	1	<DL	0	<DL	0	<DL	0		0	0	0
96	A	17-05-02	metal	polished plates	1	<DL	0	<DL	0	<DL	0		3	7800	20
97	A	17-05-02	stone	granite blocks	1	<DL	0	<DL	0	<DL	0		0	0	0
98	A	17-05-02	synth.	kitchen cloths	1	<DL	0	<DL	0	<DL	0		0	0	0
99	A	17-05-02	food	rice	1	<DL	0	<DL	0	<DL	>20	rest PH3			
100	A	17-05-02	synth.	fax ink films	1	<DL	0	<DL	0	<DL	0		0	0	0
101	B	03-06-02	food	rice	2	<DL	0	<DL	0	<DL	0		4	0	0
102	B	03-06-02	unknown	?	2	<DL	0	<DL	0	<DL	0		4	0	0
103	B	03-06-02	unknown	?	2	<DL	0	<DL	0	<DL	0		0	0	0
104	B	03-06-02	unknown	?	2	<DL	0	<DL	0.25	<DL	0		3	0	0
105	B	03-06-02	unknown	?	2	<DL	0	<DL	0	<DL	0		0	0	0
106	B	03-06-02	furnit.	wooden slats	2	<DL	0.4	<DL	0.28	<DL	0		0	0	0
107	B	03-06-02	unknown	?	2	<DL	0.1-0.2	<DL	0	<DL	0		4	0	0
108	B	03-06-02	unknown	?	2	<DL	0	<DL	0	<DL	0		0	0	0
109	B	03-06-02	unknown	powder	2	<DL	0	<DL	0	<DL	0		0	0	0
110	B	03-06-02	app.	old cars	2	<DL	0	<DL	0	<DL	0		0	0	0
111	B	04-06-02	metal	barrels	3	<DL	0	<DL	0	<DL	0		0	0	36
112	B	04-06-02	app.	cooling equip.	3	<DL	0	<DL	0	<DL	0		0	0	0
113	B	04-06-02	stone	ceramic tiles	3	<DL	0.3	<DL	0	<DL	0		0	0	0
114	B	04-06-02	food	instant soup	3	<DL	0	0.05	0	<DL	0		0	0	10

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Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com- ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
115	B	04-06-02	unknown	boxes	3	<DL	0	<DL	0	<DL	0		0	0	0
116	B	04-06-02	unknown	boxes	3	<DL	0	<DL	0	<DL	0		0	0	0
117	B	04-06-02	food	wine	3	<DL	0	<DL	0	<DL	0		0	0	32
118	B	04-06-02	metal	hubcaps	3	<DL	0	<DL	0	<DL	0		0	0	11
119	B	04-06-02	food	johannes bread	3	<DL	0	<DL	0	<DL	0.08		0	1100	37
120	B	04-06-02	unknown	not opened	3	<DL	0.5	<DL	0	<DL	0.15		0	3	25
121	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		0	0	0
122	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		0	0	0
123	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		8	0	0
124	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		0	0	0
125	B	05-06-02	unknown	?	1	<DL	0	0.1	0	<DL	0		0	0	0
126	B	05-06-02	unknown	?	1	<DL	0	<DL	0.43	<DL	0		0	0	14
127	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		0	0	0
128	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		0	0	20
129	B	05-06-02	unknown	?	1	<DL	0	<DL	0	<DL	0		0	0	0
130	A	06-06-02	app.	childrens bikes	1	<DL	0.2	<DL	0	<DL	0		0	0	0
131	A	06-06-02	metal	tools	1	<DL	0.1	<DL	0	<DL	0		0	0	0
132	A	06-06-02	furnit.	stepladders	1	<DL	0	<DL	0	<DL	0		0	0	0
133	A	06-06-02	synth.	cartridges (Canon	1	<DL	0.5	<DL	0	<DL	0		0	0	0
134	A	06-06-02	unknown	unknown	1	<DL	0	<DL	0.4	<DL	0		0	0	0
135	A	06-06-02	metal	strontium	1	<DL	0	<DL	0	<DL	0.1		0	0	35
136	A	06-06-02	food	sweetstuffs	1	<DL	0	<DL	0	<DL	0		0	0	0
137	A	06-06-02	synth.	cartridges (Canon	1	<DL	0	<DL	0	<DL	0		0	0	0
138	A	06-06-02	synth.	rubbish bags	1	<DL	0	<DL	0	<DL	0		0	0	0
139	A	06-06-02	furnit.	bamboo parquet	1	<DL	0	<DL	0	<DL	0		0	0	0
140	A	07-06-02	synth.	cotton bags	1	<DL	0	<DL	0	<DL	0		0	0	8
141	A	07-06-02	synth.	threads	1	<DL	0.5	<DL	0	<DL	0		0	0	0
142	A	07-06-02	app.	DVD players	1	<DL	0	0.05	0	<DL	0		0	0	70
143	A	07-06-02	app.	audio products	1	<DL	0	<DL	0	<DL	0		0	0	0

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Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO_2F_2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH_2O (ppm)	CH_2O (ppm)	PH_3 (ppm)	Com-ments	NH_3 (ppm)	CO_2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
144	A	07-06-02	synth.	silicon fluid	1	<DL	0	<DL	0	<DL	0		0	0	0
145	A	07-06-02	stone	granite	1	<DL	0	<DL	0	<DL	0		0	0	0
146	A	07-06-02	synth.	socks	1	<DL	0	<DL	0	<DL	0		0	0	0
147	A	07-06-02	synth.	socks	1	<DL	0	<DL	0	<DL	0		0	0	0
148	A	07-06-02	app.	cooking items	1	<DL	0	<DL	0	<DL	0		0	0	0
149	A	07-06-02	unknown	miscellaneous	1	<DL	0	<DL	0	<DL	0		0	0	0
150	A	07-06-02	app.	jet-ski's	1	<DL	> 30	90	0	<DL	0		0	0	0
151	A	07-06-02	furnit.	aquarium wood	1	<DL	5	5	0	<DL	0		0	0	0
152	B	10-06-02	metal	empty beer barrel	3	<DL	0	<DL	0	<DL	0		0	0	0
153	B	10-06-02	food	peanuts	2	<DL	0	<DL	0	<DL	0		0	0	23
154	B	10-06-02	stone	ceramic tiles	3	<DL	0.7	0.5	0	<DL	0		0	0	0
155	B	10-06-02	unknown	?	2	<DL	0	<DL	0	<DL	0		0	0	0
156	B	10-06-02	unknown	?	2	<DL	0	<DL	0	<DL	0		0	0	0
157	B	10-06-02	food	tinned peaches	3	<DL	0	<DL	0	<DL	0		0	0	0
158	B	10-06-02	app.	video recorders	2	<DL	0	<DL	0	<DL	0		0	0	4
159	B	10-06-02	app.	television sets	3	<DL	0	<DL	0	<DL	0		0	0	0
160	B	10-06-02	food	almonds	2	<DL	0	<DL	0	<DL	0.27		0	0	17
161	B	10-06-02	unknown	boxes	3	<DL	0	<DL	0	<DL	0		0	0	15
162	B	11-06-02	app.	machinery	1	<DL	0	<DL	0	<DL	0		0	0	0
163	B	11-06-02	unknown	boxes	1	<DL	0	<DL	0	<DL	0		0	0	0
164	B	11-06-02	synth.	clothing	1	<DL	0	<DL	0	<DL	0		0	0	0
165	B	11-06-02	synth.	coconut fibres	1	<DL	0	<DL	0	<DL	0.21	O2<18%	0	12700	428
166	B	11-06-02	synth.	textiles	1	<DL	0	<DL	0	<DL	0		0	0	0
167	B	11-06-02	food	coffee	2	<DL	0	<DL	0	<DL	0		0	0	0
168	B	11-06-02	stone	ore in bags	1	<DL	0	<DL	0	<DL	0		0	0	0
169	B	11-06-02	furnit.	furniture	1	<DL	0	<DL	0	<DL	0		0	0	0
170	B	11-06-02	app.	toner	1	<DL	0	<DL	0	<DL	0		0	0	0
171	B	12-06-02	app.	scanners	1	<DL	0	<DL	0	<DL	0		0	0	10
172	B	12-06-02	app.	cycle parts	1	<DL	0	<DL	0	<DL	0		0	0	0
173	B	12-06-02	synth.	candles	1	<DL	0	<DL	0	<DL	0		0	0	19

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Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
174	B	12-06-02	app.	cartridges	1	<DL	0.2	<DL	0	<DL	0		0	0	0
175	B	12-06-02	synth.	textiles	1	<DL	0	<DL	0	<DL	0		0	0	0
176	B	12-06-02	app.	cd rewriters	1	<DL	0	<DL	0	<DL	0.12		0	0	24
177	B	12-06-02	app.	toys	1	<DL	0	<DL	0	<DL	0		0	0	0
178	B	12-06-02	app.	roller skates	1	<DL	0.2	<DL	0	<DL	0		0	0	7
179	B	12-06-02	app.	printers	1	<DL	0.2	<DL	0	<DL	0		0	0	0
180	B	12-06-02	unknown	boxes	1	<DL	0	<DL	0	<DL	0		0	0	0
181	B	13-06-02	app.	halogen lamps	1	<DL	0	<DL	0	<DL	0		0	0	0
182	B	13-06-02	furnit.	candle holders	1	<DL	0	<DL	0	<DL	0		0	0	0
183	B	13-06-02	synth.	shoes	1	<DL	0	<DL	0	<DL	0		0	0	140
184	B	13-06-02	furnit.	cane chairs	1	<DL	1	0.6	> 1	1.82	0		0	0	0
185	B	13-06-02	furnit.	garden fences	1	<DL	0	<DL	0	<DL	0		0	12100	20
186	B	13-06-02	food	tins of pineapple	1	<DL	0	<DL	0	<DL	0		0	0	0
187	B	13-06-02	food	tins of tuna	1	<DL	0.1	<DL	0	<DL	0		0	0	0
188	B	13-06-02	furnit.	furniture	1	<DL	0	<DL	0	<DL	0		0	0	0
189	B	13-06-02	synth.	adidas shirts	1	<DL	0	<DL	0	<DL	0		0	0	6
190	B	13-06-02	furnit.	wooden borders	1	<DL	0	<DL	0	<DL	0		0	2300	12
191	B	13-06-02	synth.	artificial flowers	1	<DL	0	<DL	0	<DL	0		0	0	0
192	B	13-06-02	unknown	unknown	1	<DL	0	<DL	0	<DL	0		0	0	81
193	B	14-06-02	metal	car chassis	2	<DL	0	<DL	0	<DL	0		0	0	0
194	B	14-06-02	synth.	plastic granules	2	<DL	0	<DL	0	<DL	0		0	0	0
195	B	14-06-02	synth.	synth. granules	2	<DL	0	<DL	>5	<DL	0.3		8	0	150
196	B	14-06-02	synth.	overshoes	2	<DL	0	<DL	0	<DL	0		0	0	0
197	B	14-06-02	stone	building materials	2	<DL	0	<DL	0	<DL	0		0	0	0
198	B	14-06-02	food	mashed potato	2	<DL	0	<DL	0	<DL	0		0	0	0
199	B	14-06-02	synth.	plastic granules	2	<DL	0	<DL	>5	<DL	>2.5		0	0	350
200	B	14-06-02	app.	HP-cartridges	1	<DL	0	<DL	0	<DL	0		0	0	0
201	B	14-06-02	metal	computer monitor	2	<DL	0	<DL	0	<DL	0		0	0	0
202	B	17-06-02	metal	glassware	3	<DL	0	0.01	0	<DL	0.4		0	0	35
203	B	17-06-02	stone	tiles	3	<DL	0.4	0.37	0	<DL	0		0	0	0

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Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
204	B	17-06-02	app.	television sets	3	<DL	0	<DL	0	<DL	0		0	0	0
205	B	17-06-02	metal	steel models	3	<DL	**0.8**	**0.7**	0	<DL	0		0	0	**30**
206	B	17-06-02	stone	toilets	3	<DL	0	<DL	0	<DL	0		0	0	0
207	B	17-06-02	synth.	bedding	3	<DL	0	<DL	0	<DL	0		0	0	0
208	B	17-06-02	unknown	boxes	3	<DL	0	<DL	0	<DL	0		0	0	0
209	B	17-06-02	unknown	miscellaneous	2	<DL	0	<DL	0	**0.1**	0		0	0	0
210	B	17-06-02	unknown	miscellaneous	2	<DL	0	<DL	0	**0.31**	0		0	0	0
211	B	17-06-02	unknown	miscellaneous	2	<DL	0	<DL	0	<DL	0		0	0	0
212	B	17-06-02	unknown	miscellaneous	2	<DL	0	<DL	0	<DL	0		0	0	0
213	B	18-06-02	synth.	paper tray sets	1	<DL	**0.1**	<DL	0	**0.1**	0		0	0	0
214	B	18-06-02	app.	computer equip.	1	<DL	**0.1**	<DL	0	<DL	0		0	0	0
215	B	18-06-02	app.	motors	1	<DL	0	<DL	0	<DL	0		0	0	**11**
216	B	18-06-02	synth.	leather	1	<DL	0	<DL	0	**0.12**	0		0	0	0
217	B	18-06-02	app.	computers	1	<DL	0	<DL	0	**0.3**	0		0	0	**>50**
218	B	18-06-02	synth.	brushes	1	<DL	0	<DL	0	<DL	0		0	0	0
219	B	18-06-02	synth.	ladies handbags	1	<DL	0	<DL	0	<DL	0		0	0	0
220	B	18-06-02	metal	mirrors	1	<DL	0	<DL	0	<DL	0		0	0	0
221	B	18-06-02	metal	exhaust pipes	1	<DL	**0.5**	<DL	0	<DL	0		0	0	**>25**
222	B	18-06-02	unknown	unknown	1	<DL	**0.1**	<DL	0	<DL	0		0	0	0
223	B	18-06-02	unknown	large boxes	1	<DL	0	<DL	0	**0.29**	**0.12**		0	0	**50**
224	B	18-06-02	synth.	disp.jackets	1	<DL	0	<DL	0	**0.13**	0		0	0	0
225	B	19-06-02	furnit.	furniture	2	<DL	0	<DL	0	**0.93**	0		0	**1200**	**210**
226	B	19-06-02	food	mashed potato	2	<DL	0	<DL	0	<DL	0		0	0	0
227	B	19-06-02	food	potato flour	2	<DL	0	<DL	0	<DL	0		0	0	0
228	B	19-06-02	metal	hubcaps	2	<DL	0	<DL	0	<DL	0		0	0	0
229	B	19-06-02	furnit.	furniture	2	<DL	0	<DL	0	**0.32**	0		0	0	**60**
230	B	19-06-02	food	tobacco	2	<DL	0	<DL	0	<DL	**0.08**	**CN:1,3pp**	0	**2700**	**170**
231	B	19-06-02	synth.	TNT post	2	<DL	0	<DL	0	<DL	0		0	0	0

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DL = detection limit

Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
232	B	19-06-02	synth.	car tyres	2	<DL	0	<DL	0	<DL	0		0	0	0
233	B	19-06-02	app.	comp.monitors	2	<DL	removed due to risk of explosion								
234	B	19-06-02	app.	comp.monitors	2	<DL	0	<DL	0	<DL	0		0	0	0
235	B	20-06-02	food	seeds	2	<DL	0	<DL	0	<DL	0		0	0	0
236	B	20-06-02	food	seeds	2	<DL	0	<DL	0	<DL	0		0	0	0
237	B	20-06-02	food	soja beans	2	<DL	0	<DL	0	<DL	0		0	0	0
238	B	20-06-02	synth.	roofing materials	2	<DL	0.5	0.25	0	<DL	0		0	0	0
239	B	20-06-02	unknown	boxes	2	<DL	0	<DL	0	<DL	0		0	0	0
240	B	20-06-02	app.	air fresheners	2	<DL	0	<DL	0	<DL	0		0	0	0
241	B	20-06-02	synth.	tissues	2	<DL	0	<DL	0	<DL	0		0	0	0
242	B	20-06-02	app.	refrigerators	2	<DL	0	<DL	0	<DL	0		0	0	0
243	B	20-06-02	metal	beer barrels	2	<DL	0.3	<DL	0	<DL	0		0	0	0
244	B	20-06-02	unknown	boxes	2	<DL	0	<DL	0	<DL	0		0	0	0
245	B	20-06-02	unknown	boxes	2	<DL	0	<DL	0	<DL	0		0	0	0
246	B	21-06-02	food	noodles	1	<DL	0	<DL	0	<DL	0	rest PH3			
247	B	21-06-02	metal	convectors	2	<DL	0	<DL	0	<DL	0		0	0	83
248	B	21-06-02	stone	marble	1	<DL	0	<DL	0	<DL	0			575000	15
249	B	21-06-02	food	veg.oil	2	<DL	0	<DL	0	0.19	0		0	0	0
250	B	21-06-02	synth.	resins	2	<DL	0	<DL	0	<DL	0.11		0	0	42
251	B	21-06-02	metal	cooking pans	1	<DL	0	<DL	0	<DL	0		0		
252	B	21-06-02	app.	car parts	2	<DL	0	<DL	0	<DL	0		0	0	0
253	B	21-06-02	synth.	synthetics	2	<DL	0	<DL	0	<DL	0		0	0	106
254	B	21-06-02	metal	thermos flasks	1	<DL	0	<DL	0	<DL	0		0	0	0
255	B	21-06-02	food	peppercorns	1	<DL	0	<DL	0	<DL	0		0	0	0
256	B	21-06-02	food	pepper	1	<DL	0	0.2	0	<DL	0.44		0	0	200
257	B	21-06-02	food	pepper	2	<DL	0	<DL	0	0.11	0		0	0	90
258	B	24-06-02	app.	television sets	3	<DL	0	<DL	0	<DL	0		0	0	0

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Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
259	B	24-06-02	food	white beer	3	<DL	0	<DL	0	<DL	0		0	0	0
260	B	24-06-02	furnit.	hardwood	2	<DL	0	<DL	0	<DL	0.14	O2=14%	0	58000	>>>>
261	B	24-06-02	synth.	granulate	3	<DL	0	0.2	0	<DL	0.12		0	0	18
262	B	24-06-02	app.	scaffolding	2	<DL	0	<DL	0	<DL	0		0	0	17
263	B	24-06-02	app.	kitchen access.	2	<DL	0	<DL	0	<DL	0		0	0	0
264	B	24-06-02	food	dried fruit	2	<DL	0	<DL	0	<DL	0		0	0	53
265	B	24-06-02	synth.	chemicals	2	<DL	0	<DL	0	<DL	0		0	0	0
266	B	24-06-02	metal	glassware	3	<DL	0	<DL	0	<DL	0.24		0	0	31
267	B	24-06-02	synth.	socks	3	<DL	0.1/0.2	<DL	0	<DL	0		0	0	0
268	B	24-06-02	food	onion powder	2	<DL	0	<DL	0	<DL	0.13		0	0	69
269	B	24-06-02	food	orange peel	3	<DL	0	<DL	0	<DL	>20		0	0	120
270	B	24-06-02	synth.	clothing	2	<DL	0	<DL	0	<DL	0		0	0	0
271	A	26-06-02	app.	play station	1	<DL	0	<DL	0	<DL	0		0	0	0
272	A	26-06-02	unknown	boxes	1	<DL	0	<DL	0	1.4	0		0	0	0
273	A	26-06-02	synth.	clothing	1	<DL	0	<DL	0	<DL	0		0	0	0
274	A	26-06-02	synth.	tubes/pipes	1	<DL	0	<DL	0	<DL	0		0	0	0
275	A	26-06-02	app.	microwaves	1	<DL	0	<DL	0	<DL	0		0	0	0
276	A	26-06-02	app.	microwaves	1	<DL	0	<DL	0	<DL	0		0	0	23
277	A	26-06-02	unknown	boxes	1	<DL	0.1	<DL	0	<DL	0		0	0	0
278	A	26-06-02	unknown	white powder	1	<DL	0.1	<DL	0	<DL	0		0	0	15
279	A	26-06-02	app.	air conditioners	1	<DL	0	<DL	0	<DL	0		0	0	0
280	A	27-06-02	synth.	cans of acrylate	1	<DL	0	<DL	0	<DL	0		0	0	0
281	A	27-06-02	app.	telephones	1	<DL	0.1/0.2	<DL	0	<DL	0		0	0	0
282	A	27-06-02	synth.	advertising mat.	1	<DL	0	<DL	0	<DL	0		0	0	0
283	A	27-06-02	app.	white goods	1	<DL	0	<DL	0	<DL	0		0	0	0
284	A	27-06-02	app.	white goods	1	<DL	0	<DL	0	<DL	0		0	0	25
285	A	27-06-02	app.	comp.monitors	1	<DL	0.1	<DL	0	<DL	0		0	0	0
286	A	27-06-02	app.	comp.monitors	1	<DL	0	<DL	0	<DL	0		0	0	0
287	A	27-06-02	furnit.	cane furniture	1	<DL	0	0.04	0	0.13	0		0	0	25
288	A	27-06-02	furnit.	plant sticks	1	<DL	0	<DL	0	<DL	0		0	0	0
289	A	27-06-02	furnit.	wooden toys	1	<DL	0	<DL	0	<DL	0		0	0	30

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Seq.nr	terminal	date	cargo class.	Cargo	orig.	SO2F2 (ppm)	MeBr (ppm)	MeBr (ppm)	CH2O (ppm)	CH2O (ppm)	PH3 (ppm)	Com-ments	NH3 (ppm)	CO2 (ppm)	CO (ppm)
						lab.	field	lab.	field	lab.	field		field	field	field
290	A	27-06-02	synth.	inner soles	1	<DL	0	<DL	0	<DL	0		0	0	**23**
291	A	27-06-02	app.	monitors	1	<DL	0	<DL	0	<DL	0		0	0	0
292	A	27-06-02	app.	monitors	1	<DL	0	<DL	0	<DL	0		0	0	0
293	A	27-06-02	app.	parts for mon.	1	<DL	0	<DL	0	<DL	0		0	0	0
294	A	27-06-02	app.	parts for mon.	1	<DL	**0.1**	<DL	0	<DL	0		0	0	**20**
295	A	27-06-02	app.	mobile phones	1	<DL	0	<DL	0	<DL	0		0	0	0
296	A	27-06-02	stone	flower pots	1	<DL	**0.1**	**0.08**	0	<DL	0		0	0	0
297	A	27-06-02	furnit.	cane furniture	1	<DL	0	<DL	0	<DL	0		0	0	0
298	A	27-06-02	furnit.	cane furniture	1	<DL	**0.4**	<DL	0	<DL	0		0	0	**50**
299	A	27-06-02	furnit.	cane furniture	1	<DL	**0.1**	<DL	0	<DL	**0.21**		0	0	**43**
300	A	27-06-02	furnit.	cane furniture	1	<DL	**0.1**	<DL	0	<DL	**0.11**		0	0	**30**
301	A	27-06-02	stone	flower pots	1	<DL	0	**0.08**	0	<DL	0		0	0	0
302	A	27-06-02	synth.	cane baskets	1	<DL	0	<DL	0	<DL	0		0	0	**30**
303	A	27-06-02	stone	flower pots	1	<DL	**0.25**	<DL	0	<DL	0		0	0	0

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