Determination of damage substance category toxic liquids

Regional OGS/WVD

Form **Tox. Liq.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is
stationary ☐ storage ☐ production
transport ☐ road ☐ rail ☐ water ☐ pipeline

Substance in question .....

This substance comes into the class *(see Enclosure L)*
☐ very low ☐ low ☐ medium ☐ high ☐ very high ☐ extreme

Scenario 1: Toxic gas cloud
resulting from a pool of liquid

Amount of liquid in the subject in question (if necessary use standard value from table L1) ..... m^3

Area of resulting pool of liquid *(see tables L1 en L2)* ..... m^2

Read off the damage distances from figures L1 and L2 and the associated breadths from figure L3

Fatalities (rectangle)
L1= ..... m
B1 = ... m
} → Area A1 = L1 x B1 = ... m^2

Wounded (rectangle)
L2= ..... m
B2 = ... m
} → Area A2 = L2 x B2 = ... m^2

Enter the calcutated areas of damage in section II of the main form

Determination of damage substance category toxic gases, gas under pressure

Regional OGS/WVD

Form **Tox. Ga**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is
stationary ☐ storage
transport ☐ pipeline

Substance in question .....

This substance comes into the class *(see Enclosure O)*
Toxicity class no. .....
pressure ..... bar
therefore class no. .....
therefore ☐ very low ☐ low ☐ medium ☐ high ☐ very high ☐ extreme

Scenario 1: Toxic gas cloud
resulting from continuous outflow from pipe section

Pipe diameter in the subject in question ..... m

Read off the damage distances from figures O1 and O2 and the associated breadths from figure O3

Fatalities (rectangle)
L1= ..... m
B1 = ... m
} → Area A1 = L1 x B1 = ... m^2

Wounded (rectangle)
L2= ..... m
B2 = ... m
} → Area A2 = L2 x B2 = ... m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category toxic combustion products

Regional OGS/WVD

Form **Tox. CP.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary storage

Substance in question ☐ fertilisers ☐ pesticides ☐ plastics

More detailed specification .....

Scenario 1: Toxic gas cloud
resulting from fire in the store

Area of store
(where appropriate of each compartmentalised unit) ..... m^2

Read off the damage distances from figures Q1 and Q2 and the associated breadths from figure Q3

Fatalities (rectangle)
L1= ..... m
B1 = ... m
→ Area A1 = L1 x B1 = ... m^2

Wounded (rectangle)
L2= ..... m
B2 = ... m
→ Area A2 = L2 x B2 = ... m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category flammable liquids

Regional OGS/WVD

Form **Fl. Liq.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary ☐ storage ☐ production

transport ☐ road ☐ rail ☐ water ☐ pipeline

Substance in question .....

This substance can/cannot form an explosive gas cloud *(see Enclosure F)* ☐ can ☐ cannot

Scenario 1: Pool fire

Amount of liquid in the subject in question: (if necessary, use standard values from table F1) ..... m^3

Area of the resulting pool of liquid *(see tables F1 and F2)* ..... m^2

Read off the damage distances from figures F1 and F2

Fatalities (circle) R1= ..... m → Area A1 = 3.14 x $(R1)^2$ = ... m^2

Wounded (circle) R2= ..... m → Area A2 = 3.14 x $(R2)^2$ = ... m^2

Scenario 2: Gas cloud explosion

N.B.: complete only if the substance can form an explosive gas cloud and the pool of liquid is greater than approx. 3000 m^2

Amount of liquid in the subject in question: (if necessary, use standard values from table F1) ..... m^3

Area of the resulting pool of liquid *(see tables F1 and F2)* ..... m^2

Read off the damage distance from figures F3 and F4

Fatalities (rectangle) L1= ..... m

B1 = $\sqrt{\text{(area of pool)}}$ ... m } → Area A1 = L1 x B1 = ... m^2

Wounded (circle) R2 = ... m → Area A2 = 3.14 x $(R2)^2$ = ... m^2

N.B.: centre of circle is at a distance of half a cloud length (L1)

Finally, enter the largest calculated areas of damage from the two scenarios in section II of the main form.

Determination of damage substance category toxic powders

Regional OGS/WVD

Form **Tox. Sol**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary ☐ storage ☐ production

Substance in question .....

This substance comes into the class *(see Enclosure P)* ☐ low ☐ medium ☐ high ☐ very high ☐ extreme

Scenario 1: Toxic gas cloud
resulting from the release of 10% of the system contents

Amount of toxic powder in the subject in question ..... kg

Read off the damage distances from figures P1 and P2 and the associated breadths from figure P3

Fatalities (rectangle) L1= ..... m
B1 = ... m
→ Area A1 = L1 x B1 = ... m^2

Wounded (rectangle) L2= ..... m
B2 = ... m
→ Area A2 = L2 x B2 = ... m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category flammable gases, gas under pressure

Regional OGS/WVD

Form **Fl.Ga**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity by ☐ pipeline main network ☐ pipeline regional network

Substance in question .....

Scenario 1: Fire
resulting from a leak in a pipeline

Read the damage distances from the table in Enclosure J

Fatalities (circle) R1= ..... m → Area A1 = 3.14 x $(R1)^2$ = ... m^2

Wounded (circle) R2= ..... m → Area A2 = 3.14 x $(R2)^2$ = ... m^2

Enter the calcutated areas of damage in section II of the main form

Register of existing hazardous activities

District/region .....

Completed by ..... Date .....

Activity number	Address	Category	Information available	Relevant substances	Initials and date

Ministry of Home Affairs
Fire Service Directorate

Determination of damage substance category toxic gases liquefied by cooling

Regional OGS/WVD

Form **Tox. Ga.Co.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary ☐ storage

Substance in question .....

This substance comes into the class *(see Enclosure N)* ☐ very low ☐ low ☐ medium ☐ high ☐ very high ☐ extreme

Scenario 1: Toxic gas cloud
resulting from continuous outflow from transfer pipe

Amount of gas in the subject in question ..... m^3

Read off the damage distances from figures N1 and N2 and the associated breadths from figure N3

Fatalities (rectangle) L1= ..... m
B1 = ... m
→ Area A1 = L1 x B1 = ... m^2

Wounded (rectangle) L2= ..... m
B2 = ... m
→ Area A2 = L2 x B2 = ... m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category explosives

Regional OGS/WVD

Form **Expl.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary ☐ storage ☐ production

transport ☐ road ☐ rail ☐ water

Substance in question .....

This substance belongs to category (see Enclosure K) ☐ organic peroxides ☐ explosives ☐ fireworks

Scenario 1: Detonation
resulting from the explosion of systems contents

Amount of explosive in the subject in question ..... x 10^3 kg

Calculate the equivalent amount of TNT by

multiplying this amount by 10 for organic peroxides

leaving this amount unchanged for pure explosives

dividing this amount by 10 for fireworks and objects containing explosives

The effictive amount of explosive is then ..... x 10^3 kg TNT

Read off the damage distances from figures K1 en K2

Fatalities (circle) R1= ..... m ⟶ Area A1 = 3.14 x $(R1)^2$ = ... m^2

Wounded (circle) R2= ..... m ⟶ Area A2 = 3.14 x $(R2)^2$ = ... m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category toxic gases liquified by compression

Regional OGS/WVD

Form **Tox.Ga.Pr.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is
stationary ☐ storage ☐ production

transport ☐ road ☐ rail ☐ water ☐ pipeline

Substance in question .....

This substance comes into the class *(see Enclosure M)*
☐ very low ☐ low ☐ medium ☐ high ☐ very high ☐ extreme

Scenario 1: Toxic gas cloud
resulting from continuous outflow from the largest connection or the transfer pipe

Amount of liquid in the subject in question (if necessary use standard values for means of transport from table M1) ..... x 10^3 kg

Read off the damage distances from figures M1 and M2 and the associated breadths form figure M3

Fatalities (rectangle)
L1= ..... m
B1 = ... m
} → Area A1 = L1 x B1 = ... m^2

Wounded (rectangle)
L2= ..... m
B2 = ... m
} → Area A2 = L2 x B2 = ... m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category flammable gases liquefied by cooling

Regional OGS/WVD

Form **Fl.Ga.Co**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary ☐ storage

Substance in question .....

Scenario 1: Pool fire
resulting from a leak in a pipeline

For flammable gases liquefied by cooling only storage installation are considered and in the event of an outflow the formation of an area of 1500 m^2

The damage distances are

Fatalities (circle)	R1 = 23 m ⟶	Area A1 = 3.14 x $(R1)^2$ =	1600 m^2
Wounded (circle)	R1 = 120 m ⟶	Area A1 = 3.14 x $(R2)^2$ =	45 240 m^2

Enter the calculated areas of damage in section II of the main form

Determination of damage substance category flammable gases liquefied by compression

Regional OGS/WVD

Form **Fl.Ga.Pr.**

District / region .....

Activity .....

Subject .....

Completed by ..... Date .....

Activity is stationary ☐ storage ☐ production

transport ☐ road ☐ rail ☐ water ☐ pipeline

Substance in question .....

This substance comes into ☐ class 3 ☐ class 4 (see Enclosure G)

Scenario 1: BLEVE
In the event of instantaneous release and immediate ignition

N.B.: for the activities road transport, rail transport, overground storage

Amount of gas in the subject in question ..... x 10^3 kg

Read off the damage distances from figures G1 and G2; make sure the class code is correct

Fatalities (circle) R1= ..... m → Area A1 = 3.14 x $(R1)^2$ = ... m^2

Wounded (circle) R2= ..... m → Area A2 = 3.14 x $(R2)^2$ = ... m^2

Scenario 2: Gas cloud explosion
In the event of instantaneous release and delayed ignition

N.B.: for the activities road transport, rail transport, overground storage

Amount of gas in the subject in question ..... x 10^3 kg

Read off the damage distance from figures G3 and G4; make sure the class code is correct

Fatalities (rectangle) L1= ..... m } → Area A1 = L1 x B1 = ... m^2
B1 = ... m

Wounded (circle) R2= ..... m → Area A2 = 3.14 x $(R2)^2$ = ... m^2

N.B.: centre of the circle is at a distance of half a cloud lengt (L1)

Scenario 3: Gas cloud explosion
In the event of continuous release and delayed ignition

N.B. In principle applicable to all activities, but in particular to inland waterway transport, processing plants, pipeline transport and underground storage

Amount of gas in the subject in question ..... x 10^3 kg

Read off the damage distances from figures G5 and G6; make sure the class code is correct

Fatalities (rectangle) L1= ..... m } → Area A1 = L1 x B1 = ... m^2
B1 = ... m

Wounded (circle) R2= ..... m → Area A2 = 3.14 x $(R2)^2$ = ... m^2

Now enter the largest calculated areas of damage from the three scenarios in section II of the main form.

Main form for determination of damage and risk

Regional OGS/WVD

I Identification

District / region .....

Activity .....

Subject .....

Completed by .....

Date .....

What substance is (primarily) involved with the subject in question .....

This is a: *(for identification see Enclosure B of the explanatory notes)*

☐ Flammable liquid	Complete form Fl.Liq.
☐ Flammable gas, liquefied by compression	Complete form Fl.Ga.Pr.
☐ Flammable gas, liquefied by cooling	Complete form Fl.Ga.Co.
☐ Flammable gas, gas under pressure	Complete form Fl.Ga.
☐ Explosive	Complete form Expl.
☐ Toxic liquid	Complete form Tox.Liq.
☐ Toxic gas, liquefied by compression	Complete form Tox.Ga.Pr.
☐ Toxic gas, liquefied by cooling	Complete form Tox.Ga.Co.
☐ Toxic gas, gas under pressure	Complete form Tox.Ga.
☐ Toxic solid	Complete form Tox.Sol.
☐ Toxic combustion product	Complete form Tox.CP.

V Evaluation

As a result of *(scenario)* .....

With the substance .....

Number of casualties found *(see II)* ..... fatalities

..... wounded

The probability of the accident in question is regarded as *(see III)* .....

The area affected is characterised as .....

There are special (residental) buildings in the area *(see IV)* ☐ Yes ☐ No

Accident or attack plan already exist *(see IV)* ☐ Yes ☐ No namely .....

There is sufficient capacity locally for casualties *(see IV)* ☐ Yes ☐ No

The drafting an emergency management for this situation is *(see II)* .....

II Determination of damage

Enter here the results of the size of the area of damage calculation from the appropriate substance category form.

Fatalities
damage area circular — the radius R1 = ... m — the area A1 = ... m^2

damage area rectangular
the length L1 = ... m
A1 = ... m^2
the breadth B1 = ... m

Reversible injury (= wounded)
damage area circular — the radius R2 = ... m — the area A2 = ... m^2

damage area rectangular
the length L2 = ... m
the area A2 = ... m^2
the breadth B2 = ... m

Using topographical maps and/or street plans select the most vulnerable area of damage that may lie inside the respective areas of damage.

Do this by drawing an outline of the area of damage on the map or on a transparent sheet that can be placed over the map.

Then determine how many people there are inside the respective areas and who therefore may be affected. Use the guidelines given in the Guide under 3.2-II.

Note here some features of the area in question

.....

.....

.....

.....

.....

The potential number of casualties is
(Enter in V as well)

Fatally injured .....

Wounded .....

On the basis of this result choose a provisional priority level for the drafting of a major incident plan for this activity by placing a cross in the box alongside one of the following alternatives.
(Enter in V as well)

- ☐ Emergency management plan urgently required
- ☐ Emergency management plan recommended
- ☐ Consider desirability of emergency management plan on completion of cataloguing in the district
- ☐ Emergency management plan probably unnecessary
- ☐ Emergency management plan absolutely unnecessary

III Determination of probability

A global indication of the frequency of occurrence of the accident in question can be determined from the tables in Enclosure D.

Refer to the table associated with the substance category and use the defined scenarios and (traffic) frequencies that are applicable.

Enter here which table was used and what information

.....

.....

.....

The frequency of this accident scenario is

f (acc) = ... per year

Multiply this figure by the probability that the number of persons calculated under II are in the threatened area. The correction factors can be found in Enclosure E.

The applicable values are

for homogeneity of area — p (hom) = ...

for location — p (loc) = ...

The resulting frequency of the calculated damage is therefore — F = f(acc) x p(loc) x p(hom) — F = ... per year

This frequency may be regarded as
(Enter in V as well)

- ☐ High to fairly high ($>10^{-3}$)
- ☐ Significant ($10^{-5} - 10^{-3}$)
- ☐ Average ($10^{-7} - 10^{-5}$)
- ☐ Low to fairly low ($10^{-9} - 10^{-7}$)
- ☐ Negligible ($<10^{-9}$)

IV Specific factors concerning the surrounding area

Say below whether the following data, relevant for an Emergency management plan, are applicable in the case in question

There are special buildings inside the potential area of damage (hospital, old people's home, school, etc.) ☐ yes ☐ no

If so, state what they are.
How many people may be there .....

.....

.....

The nature of the accident scenario makes an adequate response to the source possible ☐ yes ☐ no

A fire brigade attack plan for this ☐ exists ☐ must be made

For the activity (factory) itself there is a(n) ☐ emergency plan ☐ works' civil defence plan ☐ .....

There are sufficient facilities available (ambulances, hospital beds, staff, etc.) in this region for the transportation and reception of the wounded ☐ yes ☐ no

If the case arises, assistance can be obtained from .....

Enter the relevant items in section V