

SFK/TAA

MAJOR ACCIDENT COMMISSION

**TECHNICAL COMMITTEE
FOR PLANT SAFETY**

at the
Federal Ministry for
Environment, Nature Conservation and Reactor Safety

**Short version of the Guidance SFK/TAA-GS-1
Recommendations for separation distances between establishments
under the Major accidents Ordinance and Areas requiring protection
within the framework of Land-Use Planning – Implementation of § 50
Federal Pollution Protection Law (BImSchG)**

SFK/TAA Working Group “Land-Use Planning”

SFK/TAA-GS-1k - en

Note:

This short version contains a summary of the results of the Guidance SFK/TAA GS-1 “Recommendations for separation distances between establishments under the Major accidents Ordinance and Areas requiring protection within the framework of Land-Use Planning – Implementation of § 50 Federal Pollution Protection Act”. In this way all stakeholders and interested bodies can obtain an overview of the extent of the validity, the results and the non-applicability of the separation distances recommendation.

As a decision making aid for the competent authorities the complete version of the guidance is to be applied.

This guidance is a first step towards an adequate solution to the problem of determining “appropriate” separation distances. For this reason an intensive exchange of experience with the practitioners should take place. All stakeholders are thus requested to pass on their experience with the application of the guidance to the secretariat of the Commission for Plant Safety (KAS¹), in order that a timely assessment of the guidance is possible.

For the European legal requirements of Article 12 of the Seveso II Directive an appropriate separation distance is to be maintained between establishments and sensitive objects as defined in the directive. This is achieved with the methods of the Land-Use Planning, which in Germany are contained in the pollution protection law as well as the urban planning law. The guidance contains separation distance recommendations and assessment methods, in order that planning activities can guarantee that areas with incompatible usage may be located at an appropriate distance from another.

The policies according to Article 12, paragraph 1 of the Seveso II Directive are defined in Germany in the Federal Building Code (BauGB) with the associated Federal land use ordinance (BauNVO) and in § 50 of the Federal Pollution Protection Act (BImSchG). The consideration of appropriate separation distances should enable that the effects of major accidents in establishments on neighbouring sensitive objects may be avoided as far as possible.

The recommendations relate to:

- The setting out of industrial and trading areas, for which the concrete usage is not yet known, which are however designated by the commune as a planning law basis for the permissible siting of establishments under the BImSchG (Land-Use Planning without detail knowledge).
- Developments in the neighbourhood of existing establishments under the BImSchG (Land-Use Planning with detail knowledge).

The separation distance recommendations are only related to people as the subject to be protected, they are not suitable for the assessment of current mixed situations (existing buildings), for the licensing procedure under BImSchG or as the basis for the external emergency planning.

On reaching or exceeding the recommended separation distances, it may be generally assumed that the effects of a major accident within an establishment, based on the assumptions made, will not lead to a serious hazard as defined in the major accident ordinance for the population. The “intermediate zone” resulting from the separation distance recommendation should not be understood as an area free of buildings. Within these distances less sensitive usage than that described in § 50, first sentence of the BImSchG may be planned. The separation distance recommendations are to be seen as guidance values based on typical assumptions.

¹ www.kas-bmu.de

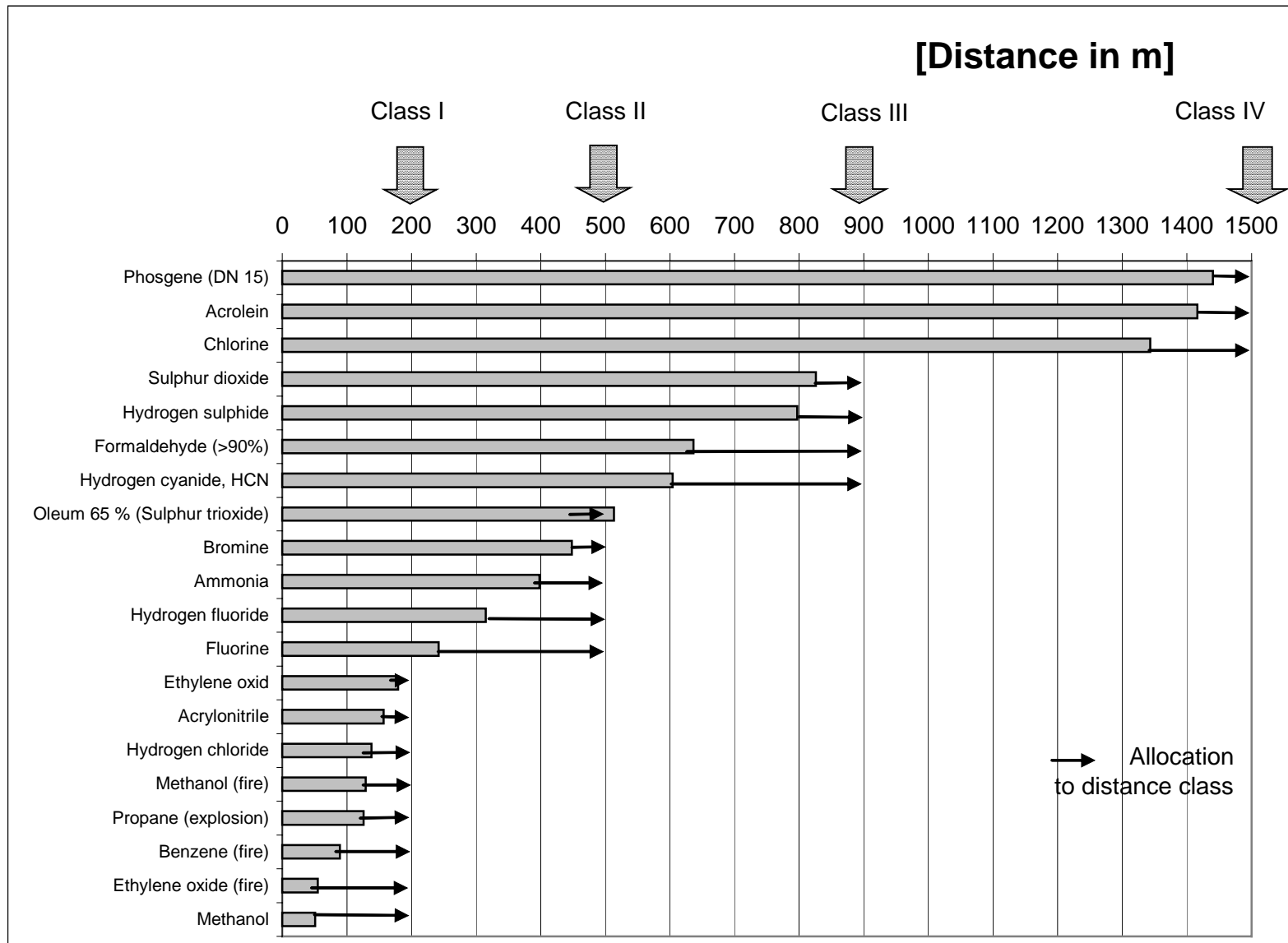
Separation distance recommendations for land-use planning without detail knowledge

In developing the separation distance recommendations a deterministic approach was chosen, in harmony with the major hazards legislation as practiced in Germany. For dealing with Explosives (2nd Explosives Ordinance – 2. SprengV) and Ammonium Nitrate (Hazardous Substances Ordinance – Gefahrstoff-Verordnung) the appropriate German regulations, which set generic distances, are to be applied. For all other hazardous substances, on the basis of long term operating experience and from an analysis of the German major accidents in the last 15 years (compare ZEMA² Reports), a source term for the release of an area of 490 mm² was adopted (equivalent to the cross-sectional area of a DN 25 pipe). As scenarios Fire / gas cloud explosion with immediate ignition and release of toxic substances were chosen, as the end-point for the thermal radiation a threshold value of 1.6 kW/m², for explosions 0.1 bar and for the toxic substances the concentration guidance value ERPG-2 were chosen. The dispersion model used was the VDI Guideline 3783. The dispersion conditions chosen for the hazardous substances were average meteorology (including a wind speed of 3 m/s) in a typical industrial topology (uniform buildings).

Substance characteristics and handling conditions lead to differing release rates for the scenarios considered. For this reason there is no simple relationship between the toxicity, thermal radiation or explosion pressure wave and the recommended separation distance. Therefore a distribution amongst separation distance classes was carried out. The results for important, representative substances are shown in Diagram 1, the details are to be found in the long version of the Report (SFK/TAA-GS-1).

² ZEMA: Central reporting and analysis office for major accidents in Germany at the Federal Environment Agency

Abb. 1: Separation distance recommendations for Land-Use Planning without detailed knowledge



Separation distance recommendations for land-use planning with detailed knowledge

For new developments in the neighbourhood of existing establishments the substances, their licensed quantities and the technical installations in which they are handled are already known. In this case a specific individual case study with a systematic hazard analysis is possible.

For future action the following recommendations are made:

1. If the distance to protective sensitive areas according to § 50 BImSchG is less than the separation distance recommendation for land-use planning without detail knowledge (see Diag. 1), then an individual case study is necessary.
2. If other legal requirements prescribe a minimum distance for the type of installation (e.g. Explosives Law, Technical Regulations) then these are to be respected.
3. For the individual case study the following recommendations are made with regard to the scenarios which are to be considered:
 - a. The loss of the complete inventory, the loss of the largest contiguous volume, bursting of a vessel and the shearing of a very large pipe are not to be considered for land-use planning, as they are so improbable when the state of the art technology is adhered to.
 - b. For storage in barrels and drums, and storage in gas bottles the release of the contents of a barrel/drum or a bottle is to be considered.
 - c. For process installations and in storage facilities it is to be assumed that leaks from pipe-work, vessels, safety equipment, etc. can occur.
 - i. In general the starting point is the consideration of a leak area of 490 mm² (equivalent to DN 25).
 - ii. In the individual case study the leak area is determined according to the technical systems actually in place.
 - iii. As a minimum assumption it is recommended that a leak of no less than 80 mm² (equivalent to DN 10) is chosen.³
 - iv. Measures to limit the effects of a release are to be considered in so far as they are not damaged by the events in the scenario considered.
 - v. It is explicitly noted that these recommendations cannot replace the consideration of the particular situation in the individual case study.

³ This corresponds to the flange leakage of larger pipe-work, the shearing of a small line, the leakage due to corrosion damage, etc.