## Assessment on Immissions

# German Technical Instructions on Air Quality Control:
# TA Luft 2002 Requirements for the Protection against Harmful Effects on the Environment

# German TA Luft 2002 No 4: Protection against Harmful Effects on the Environment

***Immission values*** **Related to a point**

**Annual immission values**

**Daily immission values**

**Hourly immission values** } **with frequencies of exceeding**

***Immission values according to***

⇒ **Protection of Human Health (No 4.2)**

⇒ **Protection against Significant Nuisances or Significant Disadvantages due to Dust fall (No 4.3)**

⇒ **Protection against Significant Disadvantages, in particular Protection of the Vegetation and of Ecosystems (No 4.4)**

⇒ **Protection against Harmful Effects of Pollutant Deposition on the Environment (No 4.5)**

⇒ **Criteria for „harmful effects on the environment“**

# Substance Immission Values in order to Ensure the Protection of Human Health (No 4.2.1)

| Substance | Concentration [µg/m³] | Averaging period | Permissible Annual Frequency of excess Values |
|---|---|---|---|
| Bencene (*) | 5 | Year | - |
| Suspended particulate matter (PM-10) | 40<br>50 | year<br>24 h | -<br>35 |
| Tetrachlorothane (*) | 10 | Year | - |
| Sulphur dioxide | 50<br>125<br>350 | Year<br>24 h<br>1 h | -<br>3<br>24 |
| Nitrogen dioxide | 40<br>200 | Year<br>1 h | -<br>18 |
| Pb in PM-10 | 0,5 | Year | - |

# Determination of the additional load caused by the total installation (No 4.6.4.2):

## Dispersion calculation

## Austal 2000: Lagrange particle model

Calculation of particle trajectories

Carried out as a time series calculation over a period of one year respectively or on the basis of a frequency distribution of dispersion situations over a period of several years

Serves to select the evaluation parcels pursuant to 4.6.2.5

## Determination without Established Immission Values and in Special Cases No 4.8 TA Luft 2002

With air pollutants for which no immission values are established and in those cases in which reference is made to 4.8 it is necessary to examine whether harmful effects on the environment may be induced if sufficient evidence speaks in favour of this. Such evidence exists, if

- according to the type of process,
- the composition of input substances, final and by-products
- the conditions of disposal of waste gas (e.g. large releases in short time caused by emergency operating)

certain substances are emitted in a way and amount, that they can cause hazards, significant disadvantages or significant nuisances to the general public or the neighbourhood

## Determination without Established Immission Values and in Special Cases No 4.8

Special relevant is the situation in the surroundings. The information related to substances and installations has to be combined with the situation in the surroundings. Criteria for sufficient evidence for possible harmful effects on environment are:

- Criteria related to the installation: e.g. large amounts of waste gas or large emission mass flows
- Criteria related to substances: e.g. emissions of odour intense or carcinogenic pollutants
- Criteria related to surroundings: e.g. special goods to be protected in the impact area (like hospital, kindergarten.

- TA Luft contains emission values – exceeding of values is avoidable applying the Best Available Techniques
- But not in every case it is guaranteed however, that in single cases harmful environmental effects can occur (if sufficient evidence exists)

## Determination without Established Immission Values and in Special Cases No 4.8

**Minor limits of an irrelevant contribution of an installation:**

- Non-carcinogenic substances harmful for health:
>>> Additional load of installation ≤ 1% of orientation value

- Carcinogenic pollutants:

>>> The total of all risks from the immissions of carcinogenic pollutants caused by an installation may not enhance the risk for cancer for humans living in the evaluation area in excess of 1:1.000.000 per life time

**Orientation values of German Länderausschusses für Immissionsschutz:**

| Pollutant | Orientation value | Averaging time |
|---|---|---|
| Styrene | 60 µg/m$^3$ | Annual and short time value |
| Toluene | 30 µg/m$^3$ | Annual |
| Xylene (Total of all 3 isomers) | 30 µg/m$^3$ | Annual |
| Tetrachloroethene | 3,5 mg/m$^3$ | Average over ½-hour |

## Determination without Established Immission Values and in Special Cases No 4.8

For pollutants without an immission value: information sources for special case determinations can be:

- WHO-Air Quality Guidelines Europe
- MIK-Values of VDI 2310
- Health Assessment Documents of EPA
- German Research Community „MAK- and BAT-values-list“ (TRGS 900): Temporarily 1/100 of the value for the working place
- NIOSH-List of „National Institute for Occupational Safety and Health“ of USA

**In cases of exceeding the threshold of irrelevance:**

>>> Determination and assessment of the total load necessary

(= additional load by installation + existing load (background load))

**Determination without Established Immission Values and in Special Cases No 4.8**

## Case study “Installation with VOC emissions”:

- No immission values exists for organic solvents
- Due to the emergency operation large mass flows of solvents resulting
- Significant nuisances can be caused by odour intense solvents like butyleneacetic ester, ethyleneacetic ester

-> Immission prognosis to determine the immission concentration in evaluation area

# Result of the immission prognosis relating to Annex 3 of TA Luft 2002 in case of adhesive coating:

| Pollutant | Indicator/time of average | Complete installation [µg/m³] | New part of installation (coating + production of adhesives) | Value for evaluation [µg/m³] |
|---|---|---|---|---|
| Ethylene-acetic ester | IJZ (annual) | 29 | 9,5 | 15.000 |
| | ITZ (daily) | 135 | 47 | 15.000 |
| | ISZ (hourly) | 210 | 46 | 15.000 |
| Total-C | IJZ (annual) | 16 | 5,2 | - |

**Ethlyeneacetic ester = Master component; value for evaluation: here temporarily 1/100 of maximum working place concentration (MAK)**

- **IJZ = Annual additional load [µg/m³]**
- **ITZ = Daily additional load [µg/m³]**
- **ISZ = Hourly additional load [µg/m³]**

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