

# 5.D.2 - Industrial Wastewater Handling

## Short description

| Category Code                                                                             | Method                               | AD | EF |
|-------------------------------------------------------------------------------------------|--------------------------------------|----|----|
| 5.D.2                                                                                     | T1                                   | NS | D  |
| <b>Method(s) applied</b>                                                                  |                                      |    |    |
| <b>D</b>                                                                                  | Default                              |    |    |
| <b>T1</b>                                                                                 | Tier 1 / Simple Methodology *        |    |    |
| <b>T2</b>                                                                                 | Tier 2*                              |    |    |
| <b>T3</b>                                                                                 | Tier 3 / Detailed Methodology *      |    |    |
| <b>C</b>                                                                                  | CORINAIR                             |    |    |
| <b>CS</b>                                                                                 | Country Specific                     |    |    |
| <b>M</b>                                                                                  | Model                                |    |    |
| * as described in the EMEP/EEA Emission Inventory Guidebook - 2019, in category chapters. |                                      |    |    |
| <b>(source for) Activity Data</b>                                                         |                                      |    |    |
| <b>NS</b>                                                                                 | National Statistics                  |    |    |
| <b>RS</b>                                                                                 | Regional Statistics                  |    |    |
| <b>IS</b>                                                                                 | International Statistics             |    |    |
| <b>PS</b>                                                                                 | Plant Specific                       |    |    |
| <b>As</b>                                                                                 | Associations, business organisations |    |    |
| <b>Q</b>                                                                                  | specific Questionnaires (or surveys) |    |    |
| <b>M</b>                                                                                  | Model / Modelled                     |    |    |
| <b>C</b>                                                                                  | Confidential                         |    |    |
| <b>(source for) Emission Factors</b>                                                      |                                      |    |    |
| <b>D</b>                                                                                  | Default (EMEP Guidebook)             |    |    |
| <b>CS</b>                                                                                 | Country Specific                     |    |    |
| <b>PS</b>                                                                                 | Plant Specific                       |    |    |
| <b>M</b>                                                                                  | Model / Modelled                     |    |    |
| <b>C</b>                                                                                  | Confidential                         |    |    |

| NO <sub>x</sub> | NM <sub>VOC</sub>                                                                            | SO <sub>2</sub>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | NH <sub>3</sub> | PM <sub>2.5</sub> | PM <sub>10</sub> | TSP | BC | CO | Pb | Cd | Hg | As | Cr | Cu | Ni | Se | Zn | PCDD/F | B(a)P | B(b)F | B(k)F | I(x)P | PAHs | HCB | PCB        |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
|-----------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------------|------------------|-----|----|----|----|----|----|----|----|----|----|----|----|--------|-------|-------|-------|-------|------|-----|------------|----------------------------------|------------|----------------------------------|------------|----------------------------------------------------|------------|----------------------------------|-----------|----------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------|----------|------------------|
| NA              | -/-                                                                                          | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | NA              | NA                | NA               | NA  | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA     | NA    | NA    | NA    | NA    | NA   | NA  | NA         |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
|                 |                                                                                              | <table border="1"> <tr> <td><b>L/-</b></td> <td>key source by <b>L</b>evel only</td> </tr> <tr> <td><b>-/T</b></td> <td>key source by <b>T</b>rend only</td> </tr> <tr> <td><b>L/T</b></td> <td>key source by both <b>L</b>evel and <b>T</b>rend</td> </tr> <tr> <td><b>-/-</b></td> <td>no key source for this pollutant</td> </tr> <tr> <td><b>IE</b></td> <td>emission of specific pollutant <b>I</b>ncluded <b>E</b>lsewhere (i.e. in another category)</td> </tr> <tr> <td><b>NE</b></td> <td>emission of specific pollutant <b>N</b>ot <b>E</b>stimated (yet)</td> </tr> <tr> <td><b>NA</b></td> <td>specific pollutant not emitted from this source or activity = <b>N</b>ot <b>A</b>pplicable</td> </tr> <tr> <td><b>*</b></td> <td>no analysis done</td> </tr> </table> |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     | <b>L/-</b> | key source by <b>L</b> evel only | <b>-/T</b> | key source by <b>T</b> rend only | <b>L/T</b> | key source by both <b>L</b> evel and <b>T</b> rend | <b>-/-</b> | no key source for this pollutant | <b>IE</b> | emission of specific pollutant <b>I</b> ncluded <b>E</b> lsewhere (i.e. in another category) | <b>NE</b> | emission of specific pollutant <b>N</b> ot <b>E</b> stimated (yet) | <b>NA</b> | specific pollutant not emitted from this source or activity = <b>N</b> ot <b>A</b> pplicable | <b>*</b> | no analysis done |
| <b>L/-</b>      | key source by <b>L</b> evel only                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
| <b>-/T</b>      | key source by <b>T</b> rend only                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
| <b>L/T</b>      | key source by both <b>L</b> evel and <b>T</b> rend                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
| <b>-/-</b>      | no key source for this pollutant                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
| <b>IE</b>       | emission of specific pollutant <b>I</b> ncluded <b>E</b> lsewhere (i.e. in another category) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
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| <b>NA</b>       | specific pollutant not emitted from this source or activity = <b>N</b> ot <b>A</b> pplicable |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |
| <b>*</b>        | no analysis done                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 |                   |                  |     |    |    |    |    |    |    |    |    |    |    |    |        |       |       |       |       |      |     |            |                                  |            |                                  |            |                                                    |            |                                  |           |                                                                                              |           |                                                                    |           |                                                                                              |          |                  |

In category **5.D.2**, **NM<sub>VOC</sub> emissions** from industrial wastewater handling are reported. The industrial section is covered by wastewaters from industrial processes. Main sectors are chemical industries, iron & steel industries, power generation, Food sector, Paper & Cardboard-production and “Other”-Industrial processes.

## Method

Emissions reported under this category are calculated using the Tier 1 approach of the EMEP/EEA Guidebook 2023, where the emission factor (EF) is 15 mg/m<sup>3</sup> wastewater (Part B, 5.D, chap. 3.2.2, Table 3-1, p. 7<sup>1)</sup>). This EF is multiplied with the total amount of wastewater (AD) treated in industrial wwt-plants, following the equation:

$$EM_{NMVOC} = AD \times EF \text{ (} \textit{ibid.}, \textit{chap.3.2.1} \text{)}$$

## Activity data

Total volumes of treated industrial wastewater are derived by the German statistical agency (Statistisches Bundesamt, Umweltnutzung und Wirtschaft. Tabellen zu den Umweltökonomischen Gesamtrechnungen. Teil 4: Wassereinsatz, Abwasser. Table 7.7<sup>2)</sup>). The availability of the data starts in 1991 with new data for every following year, until 2001. Until then the data source is published on a three-year basis with new data only for the respective year of the update. Missing data are interpolated. Since the Wastewaterstatistic has not been updated since 2016, the data for Chemical Industry and Paper&Cardboard has been extrapolated until 2017 on the basis of an expert judgment, assuming for the Chemical Industry a yearly reduction of 1% and for Paper&Cardboard of 1,5%. For the remaining industries expert-judgement concluded that constant values since 2016 are deemed to be most probable.

## Emission factors

See method.

It should be noted that the described default emission factor was collected in Turkey for municipal wastewater treatment plants under specific climatic conditions in developing countries. The wastewater characteristics of the considered industries sometimes differ significantly from municipal wastewater.

## Uncertainties

The AD from Statistisches Bundesamt have an uncertainty of  $\pm 3\%$  (normal distribution) whereas the uncertainty for the EF, due to its range (5/50 mg/m<sup>3</sup>), is -70 / +210 % and the distribution lognormal.

## Recalculations

Recalculations were not necessary.



For **pollutant-specific information on recalculated emission estimates** for Base Year and 2023, please see the recalculation tables following [chapter 9.1 - Recalculations](#).

## Planned improvements



At the moment, no category-specific improvements are planned.

<sup>1)</sup> EMEP/EEA (2023): EMEP/EEA air pollutant emission inventory guidebook 2023; Part B, Chapter 5.D Wastewater handling; page 7, 3.2.2 - Default emission factors, Table 3-1; Copenhagen 2023.  
<https://www.eea.europa.eu/en/analysis/publications/emep-eea-guidebook-2023/part-b-sectoral-guidance-chapters/5-waste/5-d-wastewater-handling/@download/file>

<sup>2)</sup> Statistisches Bundesamt, Umweltnutzung und Wirtschaft. Tabellen zu den Umweltökonomischen Gesamtrechnungen. Teil 4: Wassereinsatz, Abwasser. Table 7.7