GERMAN
ATV-DVWK-RULES AND STANDARDS

STANDARD ATV-DVWK-A 198E

Standardisation and Derivation of Dimensioning Values for Wastewater Facilities

April 2003

Deutsche Vereinigung für Wasserwirtschaft, Abwasser und Abfall e.V.
German Association for Water, Wastewater and Waste

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The German Association for Water, Wastewater and Waste, DWA (former ATV-DVWK), is the spokesman in Germany for all universal questions on water and is involved intensely with the development of reliable and sustainable water management. As politically and economically independent organisation it operates specifically in the areas of water management, wastewater, waste and soil protection.

In Europe the DWA is the association in this field with the greatest number of members and, due to its specialist competence it holds a special position with regard to standardisation, professional training and information of the public. The ca. 14,000 members represent the experts and executive personnel from municipalities, universities, engineer offices, authorities and businesses.

The emphasis of its activities is on the elaboration and updating of a common set of technical rules and standards and with collaboration with the creation of technical standard specifications at the national and international levels. To this belong not only the technical-scientific subjects but also economical and legal demands of environmental protection and protection of bodies of waters.

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User Notes

This Standard is the result of honorary, technical-scientific/economic collaboration which has been achieved in accordance with the principles applicable therefore (statutes, rules of procedure of the ATV-DVWK and the Standard ATV-DVWK-A 400). For this, according to precedents, there exists an actual presumption that it is textually and technically correct and also generally recognised.

The application of this Standard is open to everyone. However, an obligation for application can arise from legal or administrative regulations, a contract or other legal reason.

This Standard is an important, however, not the sole source of information for correct solutions. With its application no one avoids responsibility for his own action or for the correct application in specific cases; this applies in particular for the correct handling of the margins described in the Standard.

Authors

This Standard has been elaborated by the ad-hoc Working Group “Dimensioning-Principles for Wastewater Facilities“ within the ATV-DVWK Main Committee ES “Drainage Systems” and KA “Municipal Wastewater Treatment”.

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1 Area of Application

1.1 Preamble

In the course of the self-monitoring of wastewater treatment plants data are collected which can form a valuable basis with the planning of expansion or optimisation of both drainage systems and also wastewater treatment plants. Unfortunately, in the past, the collection and evaluation often took place unilaterally, either for wastewater treatment plants only or for sewer systems only. Terms and symbols were not always harmonised with each other, frequently the same symbols with different significance have been used in different standards. The reason was the lack of clear specifications.

After even more municipalities, associations and operating companies are managing data banks in which a great deal of basic data for water management planning are kept, a clear definition and common further processing of these data have gained in significance.

The planning of wastewater facilities should as far as possible take place on the basis of measured values. As the planning process for the expansion of existing wastewater facilities or new construction measures in individual locations as a rule spread over several years, this time should, if possible, be used to widen the data base. A reliable databasis is a basic prerequisite for an ecologically and economically practical planning, construction and operation of wastewater facilities.

Sewer systems and wastewater treatment plants are to be **operated** for the same flow. Due to the different planning horizons the sewer system can be **dimensioned** for another flow than that for the wastewater treatment plant. Previously the permitted combined wastewater flow was determined primarily according to dimensioning data or the hydraulic capacity of the wastewater treatment plant. In order to make possible an optimisation between permitted charging of the wastewater treatment plant and the dimensioning of stormwater tanks, an approach using a bandwidth of the permitted combined wastewater flow is recommended.

1.2 Objective

This Standard is concerned with the definition, collection, evaluation and examination of data as well as with the subsequent derivation of dimensioning values based on these for wastewater treatment plants and drainage systems. Forecast data for various time horizons can subsequently be derived from measured data. With this Standard the objective is pursued, globally for all ATV-DVWK Standards and Advisory Leaflets, as far as possible and practical to standardise the derivation of values for the dimensioning of drainage systems and municipal wastewater treatment plants as well as the symbols for dimensioning values.

The discharges, loads and concentrations necessary for dimensioning are, as previously, laid down in the appropriate ATV-DVWK-Standards.

The following are introduced in this standard:

- a homogeneous system for symbols;
- for hydraulic calculations a mathematical determination of the dry weather flow dissociated from meteorological records;
- for the interface sewer - wastewater treatment plant a new approach for the determination of the combined wastewater flow Q_{CWW};
- the concentration of the frequently to be determined COD as master parameter and the ratios to the less frequently determined other parameters (e.g. BOD_5, filterable solids, nitrogen and phosphorus), in order to keep the costs for chemical analysis within limits.

Should, after the publication of this Standard, divergent definitions be given in other ATV-DVWK-Standards then the latter apply.

1.3 Scope

The here summarised terms and bases for the determination of

- catchment areas,
- flows/discharges,
- loads and
- concentrations

concern all ATV-DVWK Standards and Advisory Leaflets which deal with dimensioning and application of simulation models for drainage systems, combined wastewater or stormwater treatment facilities and wastewater treatment plants (see Chap. 7, ATV-DVWK Standards).

2 Symbols

2.1 General

A common system is introduced for all symbols according to which, behind the respective main term (*A* for surfaces, *Q* for flows/discharges, *C*, *S* and *X* for concentrations and *B* for loads), an index or further indices separated by commas can follow. Alternatively, instead of the index style one can work with lowered hyphen. Special indices are continued in later chapters, however, they can also be selected sensibly, for certain applications in the respective Standards.

Authors' afternote:

In agreement with EN 752-1 it is differentiated between "wastewater" (water changed by use and discharged to a sewer system, e.g. domestic wastewater and/or commercial/industrial wastewater) [in German: Schmutzwasser] and "sewage" (wastewater and/or surface water conveyed by a sewer) [in German: Abwasser].

Translator's note:

While the main terms remain unchanged as they are recognised internationally, the indices used reflect the English translation of the individual German parameter. For simplicity and clarity these have been chosen to match as far as possible the German indices. Where this is not possible the original German symbol is placed in square brackets after the English version. This procedure is not intended to create new symbols for the English-speaking engineering community but serves solely to make German symbols/indices comprehensible to non-German speakers.

For the **main meanings** below the indices are specified in the following order:

- **Catchment areas (A_C) [A_E],** further subdivision, for example:

  $A_{C,Sep}$ [$A_{E,Tr}$] – area with separate sewer system

  $A_{C,Comb}$ [$A_{E,Mi}$] – area with combined sewer system

  $A_{C,Ind}$ [$A_{E,G}$] – commercial/industrial area

Further differentiation in lower case, for example:

p [b] – with paved surface ($A_{C,p}$) [$A_{E,b}$]

np [nb] – non-paved surface ($A_{C,np}$) [$A_{E,nb}$]

s [k] – with sewers ($A_{C,s}$ [$A_{E,k}$] and, for example, $A_{C,s,p}$ [$A_{E,k,b}$])

ns [nk] – without sewers ($A_{C,ns}$) [$A_{E,nk}$]

- **Types of flow:** [in German upper case, 1 or 2 letters], for example:

  WW [S] – wastewater flow (Q_{WW}) [Q_S]

  DW [T] – dry weather flow (Q_{DW}) [Q_T]

  Inf [F] – infiltration water flow (Q_{Inf}) [Q_F]

  Comb [M] – combined wastewater flow (Q_{Comb}) [Q_M]

  Thr [Dr] – throttle flow (Q_{Thr}) [Q_{Dr}]

- **Periods of time:** lower case, for example:

  a – year

  m – month

  t – a certain period of time, e.g. from 13.7.02 to 18.9.02

  w – week

  d – day

  h – hour

  min – minutes

  With no details: interval ≤ 5 minutes

- **Divisor for wastewater flows:**

  x in h/d, (24, 16, x for general)

  x_{Qmax} in h/d for peak values

- **Mean values for periods, e.g.:**

  aM – annual mean

  mM – monthly mean

  pM – mean for a period

  wM – weekly mean

  2wM – 2-weekly mean

  dM – daily mean

  hM – hourly mean