

GERMAN ATV RULES AND STANDARDS

W A S T E W A T E R - W A S T E

STANDARD ATV - A 126E

Principles for Wastewater Treatment in Sewage Treatment Plants according to the Activated Sludge Process with Joint Sludge Stabilisation with Connection Values between 500 and 5.000 Total Number of Inhabitants and Population Equivalents

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The ATV Working Group 1.7.4 "Operation and Maintenance of Pumping Stations, Pressure Pipelines and Stormwater Tank Systems" has prepared the following Standard.

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The Standard presented here has been prepared within the framework of the ATV committee work, taking into account the ATV Standard A 400 "Principles for the Preparation of Rules and Standards" in the Rules and Standards Wastewater/Wastes, in the January. 1994 .version. With regard to the application of the Rules and Standards, Para. 1 of Point 5 of A 400 includes the following statement "The Rules and Standards are freely available to everyone. An obligation to apply them can result for reasons of legal regulations, contracts or other legal grounds. Whosoever applies them is responsible for the correct application in specific cases. Through the application of the Rules and Standards no one avoids responsibility for his own actions. However, for the user, prima facie evidence shows that he has taken the necessary care.

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Preface

The ATV Specialist Committee 2.10, from the start of its work and now for over two decades, has followed the development and the practical application of activated sludge plants with joint sludge stabilisation.

With the introduction of Appendix 1 of the „General Basic Administrative Regulations on the Minimum Requirements for the Discharge of Wastewater into Lakes and Rivers“, the classification sizes of sewage treatment plants were regraded and the respectively associated minimum requirements were again tightened. ATV Standards A 126 and A 131 must therefore be revised and newly matched to each other for limitations. Thus, the limit of the area of application was reduced from the previous 10,000 to 5,000 total number of inhabitants and population equivalents (IPE).

ATV Specialist Committee 2.6 has thoroughly reworked ATV Standard A 131 „Dimensioning of Single-Stage Activated Sludge Plants with More Than 5000 Total Number of Inhabitants and Population Equivalents“ with regard to deliberate nitrogen and phosphorus removal. The new version of this Standard was published in February 1991.

The new version of ATV Standard A 126 presented here „Principles for Wastewater Treatment in Sewage Treatment Plants According to the Activated Sludge Process with Joint Sludge Stabilisation with Connection Values between 500 and 5000 Total Number of Inhabitants and Population Equivalents“ takes into account, above all in comparison with the area of application of ATV Standard A 131, different minimum requirements for plants of expansion sizes < 5000 IPE and the resultant process-technical concept.

The following, essential aspects mark this Standard:

- ATV Standard 126 regulates dimensioning, construction and operation of the complete sewage treatment plant. The regulations are kept deliberately simple and clear.
- As small sewage treatment plants are fundamentally more operationally sensitive than large plants due to larger variations in loading and less staff, simple constructional design and robust mechanical and electrical equipment and simple operation have priority over precise process technology.
- Nitrogen removal is not generally demanded with sewage treatment plants < 5000 IPE. The run-offs of small sewage treatment plants contribute in sum to a minor degree only to the nitrogen loading of lakes and rivers. However, the operational advantage of denitrification should be used for the stabilisation of the treatment process and for the reduction of the wastewater discharge. This statement does not contradict the requirement, in individual cases, for specific (thoroughly optimised) nitrogen removal from pollution control areas.
- Without a thoroughly optimised denitrification a dimensioning parameter for the sludge loading corresponding with the previous dimensioning recommendations of $B_{DS} = 0.05 \text{ kg}/(\text{kg}\cdot\text{d})$, in deviation to that of ATV Standard A 131, can remain retained in ATV Standard A 126. Operationally desired denitrification takes place with sewage treatment plants < 5000 IPE, with regard to the requirement for simplicity in constructional design, equipment and operation, for practical reasons simultaneously.

If, in individual cases, a thoroughly optimised denitrification is necessary then the dimensioning principles of ATV Standard A 131 can be applied.

- Small sewage treatment plants are, in the main, newly constructed in comparison with the large ones for which mainly inventory expansion and rehabilitation are fitting. In the future, even more than the average number of plants of small development size will be built, in particular for the improvement of wastewater treatment in rural areas as, inter alia, a balanced water management, the ecological retention of small flowing waters or economic reasons support this. Statistic data evaluations can - as proposed in ATV Standard A 131 - often not be furnished for the design of small sewage treatment plants. The initial loads and the development values must then be determined via formulations from experience. Thus the application of simple dimensioning rules can also be practical.

With small sewage treatment plants, which are dimensioned, constructed and operated according to the recommendations of this Standard, discharge values which meet the current requirements of sewage treatment plant size classifications 1 and 2 according to Appendix 1 of the Basic Wastewater Administrative Regulations (Rahmen-AbwVwV) can be met with careful operation. The practice oriented determinations should here serve so that defective cheap solutions are avoided equally as exaggerated, luxury solutions; rather, the bandwidth for water quality managerially necessary, technically practical and economically suitable planning, construction and operation should be shown.

The November 1987 Edition of ATV Standard A 126 is replaced with the publication of this Standard.

1 Area of Application

This Standard applies for the planning, construction and operation of sewage treatment plants according to the activated sludge process with joint sludge stabilisation with connection values between 500 and 5000 total number of inhabitants and population equivalents (IPE).

The given area of application of between 500 and 5000 IPE does not represent the respective upper and lower application limit for this process. Activated sludge plants with joint sludge stabilisation can also be suitable for connection values over 5000 IPE. The lower limit of the area of application of 500 IPE is derived from the fact that, as a rule, small plants cannot be fed with stormwater.

The following summary gives an overview of the standard specifications and regulations in which stipulations are made for activated sludge plants with joint sludge stabilisation for connection values outside those applicable for ATV Standard A 126.

ATV Standard A 131

Dimensioning of Single-Stage Activated Sludge Plants with Connection Values over 5000 Total Number of Inhabitants and Population Equivalents.

ATV Standard A 122

Principles for the Dimensioning, Construction and Operation of Small Sewage Treatment Plants with Aerobic Biological Treatment Stage for Connection Values between 50 and 500 Total Number of Inhabitants and Population Equivalents.

DIN 4261, Part 2/Part 4

Small Sewage Treatment Plants with Wastewater Aeration - Application, Dimensioning, Execution and Test/Operation and Maintenance (Area of application up to 8 m³/d domestic and industrial wastewater inflow; this corresponds to a connection value up to some 50 inhabitants)

In addition the following standard specifications and regulations are still to be applied in certain cases of application:

ATV Standard A 109

Standards for the Connection of Autobahn Facilities to Sewage Treatment Plants

ATV Standard A 123

Treatment and Disposal of Sludge from Small Sewage Treatment Plants

ATV Standard A 129

Wastewater Disposal from Recreational and Tourist Installations

DIN 19520

Wastewater from Hospitals, Standards for Treatment

In addition attention is drawn to:

DIN 19569

Wastewater treatment plants – Principles for the design of structures technical equipment

2 Processes

The activated sludge process with joint sludge stabilisation is characterised in that the sludge loading in the aeration tanks is low and a sludge digestion can be dispensed with. From this there results:

- a good treatment performance, as very low BOD₅ and COD run-off values are achieved;
- a large loading margin, as the loading variations, which are typical with small connection values, are picked up in the large volume aeration tanks;