

GERMAN **ATV-DVWK**-RULES AND STANDARDS

ADVISORY LEAFLET ATV-DVWK-M 379E

Drying of Sewage Sludge

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The German Association for Water, Wastewater and Waste, DWA, 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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Foreword

In the industrial area, drying facilities have been operated for many decades using various process techniques. Since the 70s, drying facilities are to be found here and there in municipal wastewater treatment plants. Their number increased significantly in the 80s whereby, at the same time, the overall system of drying was taken into account more comprehensively from a technical process aspect and, in particular, from the technical safety aspect.

In municipal wastewater treatment plants sewage sludge drying facilities are often placed ahead of incinerators as component of the process. Sewage sludge drying facilities can also be applied as independent drying system before an external incinerator (e.g. power station, waste incinerating plant). With the process of sewage sludge drying the diversity of possibilities for disposal is increased and the economic efficiency of longer transport routes to suitable disposal facilities becomes more calculable. Finally, the process of sewage sludge promises an increase in disposal safety.

A report on drying of municipal sewage sludge was already published in two parts Issues 10/97 and 09/99 in the *KA – Korrespondenz Abwasser*. Part 1 covered the theoretical fundamentals of sewage sludge drying as well as the drying processes to be found in operation in Germany. Part 2 dealt with the evaluation of data of a survey of ca. 30 operators of drying facilities. With this, in addition to the theoretical dimensioning data and the practical operating results, information on weak points of the facilities was also addressed.

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User Notes

This Advisory Leaflet 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.

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

This Advisory Leaflet 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 Advisory Leaflet.

1 Area of Application

This Advisory Leaflet is designed to ease the access of planners and operators of sewage sludge treatment facilities to sewage sludge drying in that they are introduced to the technical process requirements. The possibilities and problems of individual drying processes are prepared so that the decision for or against the employment of a drying facility is professionally founded and the possible choice of a drying system is enabled on a sound basis.

2 Terms

The planner, expert, the approval authority, the plant constructor and, finally, also the operator of a drying plant, in addition to the basic mechanical and process technical elements, must also take into account the legal constraints. Furthermore, they require information on the content substances which describe the structure and the special behaviour of the material to be dried with regard to the water bonding capability and the drying process itself. Therefore, for better understanding, in this and in the following section some terms and relationships are presented in brief. For more detailed information attention is drawn to the appropriate specialist literature.

Sewage sludge drying plant

Technical facilities for the extensive removal of water from sewage sludge which, as a rule, has been previously dewatered mechanically.

Full drying

The finished product/end product – with dust to granular form character – from the drying process has a dry residue (DR) $\geq 85\%$.

Partial drying

The end product from the drying process has a dry residue $< 85\%$.

Pasty phase

Change of the rheological properties of the sewage sludge with drying in the range of ca. 40 % to 50 % DR. There results a “gluey sludge” with critical transfer properties. Following the crossing over of the pasty phase a crumbly/lumpy structure is often present.

Convection drying

The sewage sludge to be dried comes into immediate contact with the heat carrier.

Contact drying

The transfer of heat from the heat carrier takes place via a contact surface.

Radiation drying

The heat is created in the sewage sludge without heat carrier using electromagnetic or infrared radiation.

Heat carrier

Medium for heat transfer such as steam, water under pressure and thermo oil (summary see Table 1).

Exhaust vapours

With the drying there results a gas mixture made