

GERMAN
DWA Rules and Standards

Advisory Leaflet DWA-M 153E

**Recommended Actions for Dealing
with Stormwater**

August 2007

Handlungsempfehlungen zum Umgang mit Regenwasser

FRÄNKISCHE



PLEASE NOTE!

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Corrigendum:

Please correct the following Tables^{*)}:

Page 28 Table A.4a, please add footnote 3):

Soil passage under swales, infiltration trenches ³⁾ , shafts or similar through laminary consistent cover layers of at least <ul style="list-style-type: none"> • 3 m thickness, permeability $k_f = 10^{-4}$ to 10^{-6} m/s (e.g. fine sand, silty sand, sandy silt) • 5 m thickness, permeability $k_f = 10^{-3}$ to 10^{-4} m/s (e.g. sandy gravel, coarse sand, medium sand) 	D4	0.35	0.45	0.60	0.80
1) Explanation of the area loads $A_{imp} : A_s$ in columns a to d (relation of the impermeable area A_{imp} to the infiltration area A_s) a: $\leq 5:1$ usually wide infiltration b: $> 5:1$ to $\leq 15:1$ usually decentralised extensive infiltration and infiltration through swales c: $> 15:1$ to $\leq 50:1$ usually centralised infiltration through swales and basins d: $> 50:1$ 2) Overgrown upper soil of this thickness is not sufficiently permeable for the intended hydraulic load without an impermissible high level of addition of sand. A reduction of the hydraulic load and thus a classification into column c is possible by a sufficient level of stormwater retention. 3) For pavers and checked bricks, the permeable part counts as infiltration area, for infiltration through pipes and trenches, the area pollution has to be determined individually.					

Page 33:

Maximum permissible transist value $D_{max} = G / B$:		$D_{max} = 2/10.5 = 0.19$
Planned treatment measures (Tables A.4a , A.4b and A.4c)	Type	Transist values D_i
Retention soil filter systems according to Advisory Leaflet DWA-M 178	D11	0.15
Emission value $E = B \cdot D$:		$E = 10.5 \cdot 0.15 = 1.6$

^{*)} amendments are indicated in bold

The German Association for Water, Wastewater and Waste (DWA) is intensively involved with the development of reliable and sustainable water management. Being a 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 approximately 14,000 members represent specialists and managers from municipalities, universities, consulting engineers, authorities and businesses.

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Foreword

Until now, urban drainage meant draining stormwater as quickly and completely as possible from residential areas through either a combined wastewater or stormwater sewerage system. This traditional drainage concept is currently changing. For several years now, there have been attempts to change current systems by using new approaches that consider ecological requirements. The main criticism on conventional drainage concepts is:

- strong decline in evaporation and storage of water in the ground from two thirds to one third of a year's height of precipitation due to the fact that originally vegetated areas are now sealed,
- increased and accelerated runoff from sealed surfaces compared to green spaces,
- shift of the ecological balance in the hydrological cycle with impact on the microclimate and local groundwater recharge,
- hydraulic load on wastewater and stormwater treatment plants due to great volumes of mildly polluted stormwater,
- hydraulic and qualitative impact on waterbodies due to high discharges at the sewage disposal points.

In the past years, retention and infiltration of stormwater were increasingly discussed as an alternative to conventional discharge and propagated as stormwater management (VSA 2002, Standard ATV-A 105E, SIEKER 2003). They ease the prime disadvantages of the discharge principle and support the balance of the ecological water cycle. Fundamental considerations regarding stormwater management need to start already during urban land-use planning.

The Advisory Leaflet provides municipalities, those obliged to dispose sewage as well as planners with fundamental considerations regarding urban land-use planning or general drainage planning.

Standard ATV-DVWK-A 198E "Standardisation and Derivation of Dimensioning Values for Wastewater Facilities" made it necessary to adjust the abbreviations used, so that the Advisory Leaflet in the available version was edited; however, the contents corresponds to the version of February 2000.

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User Notes

This Advisory Leaflet has been produced by a group of technical, scientific and economic experts, working in an honorary capacity and applying the rules and procedures of the ATV-DVWK and the Standard ATV-DVWK-A 400. Based on judicial precedent, there exists an actual presumption that this document is textually and technically correct.

Any party is free to make use of this Advisory Leaflet. However, the application of its contents may also be made an obligation under the terms of legal or administrative regulations, or of a contract, or for some other legal reason.

This Advisory Leaflet is an important, but not the sole, source of information for solutions to technical problems. Applying information given here does not relieve the user of responsibility for his own actions or for correctly applying this information in specific cases. This holds true in particular when it comes to respecting the margins laid down in this Advisory Leaflet.

1 Scope

The Advisory Leaflet provides municipalities, those obliged to dispose of sewage as well as planners with fundamental considerations regarding urban land-use planning or general drainage planning.

The Advisory Leaflet contains recommendations on the treatment of stormwater in terms of volume and quality in modified drainage or separated systems. It analyses and structures the following complex backgrounds:

- pollution and volume of the stormwater depending on usage and cover of the surface of origin,
- protection requirement of the groundwater,
- protection requirement of surface waters,
- derived from that, the required stormwater treatment that may be necessary prior to infiltration or discharge into surface waters.

While Standard ATV-A 128E regulates the treatment of combined wastewater, the Advisory Leaflet at hand makes suggestions on how stormwater should be treated without mixing it with wastewater.

It contains a simplified assessment method that allows users to take the load of underground and surface water, originating from stormwater of roof areas and of traffic areas, into account in terms of quality and volume for pedestrians, bicyclists and motor vehicles.

The method can also be applied to airfields if the traffic volume of the areas that are used in different ways is correspondingly assigned to an area type of this Advisory Leaflet. In winter, additional considerations are necessary when using de-icers (FGSV-912 1998, BMU 1999). Criteria for areas, where substances that are hazardous to waters are used, as well as railway systems are not included.

Effective protection of waterbodies against immoderate pollution can be expected if stormwater is treated in line with the principles of this Advisory Leaflet. If detailed investigations become necessary for assessing water pollution prevention, certificates of precipitation-discharge models, polluting loads or water quality models that go beyond the scope of this Advisory Leaflet have to be provided.

Standard DWA-A 100E "Guidelines of Integrated Urban Drainage (IUD)" coordinates the individual topics of the field of urban drainage. Further requirements regarding precipitation-discharge calculations can be found in Advisory Leaflet ATV-DVWK-M 165, regarding planning, construction and operation of infiltration systems for precipitation in Standard DWA-A 138E and regarding structures of centralised stormwater treatment and retention in Standard ATV-A 166.