## Sizing form for attenuation systems

(attenuation basin)



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|--|

Installation situation						
Distance from groundwater in m (ground level to max. groundwater level)						
Loading capacity	□ Pedestrian	□ Vehicle-loading	🗆 12 t / H-10, H-15	□ 30 t	□ 40t/HS-20	□ 60t/H-25

Recommended mean runoff coefficient  $\Psi$  m according to ATV-DVWK-A 117 and ATV-DVWK-M 153 (German standards)

Surface type / roof	Type of runoff	Runoff coefficient $\Psi$ m	m² area
Pitched roof	Metal, glass, slate, fibre cement,	0.9-1.0	
	brick, roofing felt	0.8-1.0	
Flat roof (incline up to 3° or approx. 5 %)	Metal, glass, fibre cement	0.9-1.0	
	Roofing felt, roofing film	0.9	
	Gravel	0.7	
Green roof	Topsoil layer < 10 cm	0.5	
(incline up to 15° or approx. 25 %)	Topsoil layer > 10 cm	0.3	
	Asphalt, jointless concrete	0.9	
Roads, paths and public areas (flat)	Paving with sealed joints	0.75	
	Solid gravel	0.6	
	Paving with open joints	0.5	
	Loose gravel, gravel lawn	0.3	
	Composite stone with joints, permeable stone	0.25	
	Grass pavers	0.15	
Embankments, verges and trenches with rain run-off to drainage system	Clay soil	0.5	
	Loamy sandy soil	0.4	
	Gravel and sandy soil	0.3	
Gardens, meadows and cultivat- ed land with potential rain run-off to drainage system	Flat terrain	0.0-0.1	
	Steep terrain	0.1-0.3	
Permitted discharge in l/s	l/s		
Volume per m <sup>2</sup> of roof area	l/m²		
Area available for attenuation (length x width in m)			х

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The local rainfalls are very important for the dimensioning of an infiltration or attenuation system. The system should be planned so that short-term heavy rainfall as well as long-term continuous rainfall events can be stored, attenuated or infiltrated. Due to local government laws and regulations the used period of time for a calculation may vary from 5 to 100 years. Most of the calculations are done with 5 year rain data, see picture/table below.

## Values given as an example:

D [min]	rain flow [l/s*ha]	rain volume [l/100 m²]
5	380.7	1142.1
10	245.6	1473.6
20	158.9	1906.8
30	123.4	2221.2
60	80.3	2890.8
120	47.8	3441.6
240	28.4	4089.6
540	15.5	5022.0
720	12.5	5400.0
1440	7.3	6307.2
2880	4.1	7084.8
4320	2.9	7516.8

The table contains 5 year rain data of Berlin.



In combination with soil type, the critical value (max. value for infiltration system dimensions) could lie between 5 minutes (good soil) and 4320 minutes (clay or loam).

## **Input Data**

Period of time: \_\_\_\_\_

D [min]	rain flow [l/s*ha]	inlet [l/s]	rainfall [mm/m²]
A reasonable dimensioning of an infilt	ration or detention system can o	nly be done with a complete rainfal	series.

If you e-mail this form to mail@graf.info or send it to us by fax, we will calculate the required infiltration or attenuation volume and draw up a free quotation.