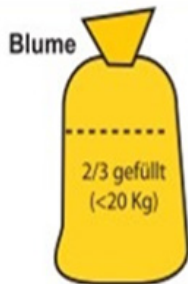


## Sandbags



Weight: approx 15-20 Kg  
 Europalette: " 50-70 Sandbags  
 1 t respectively: " 50 Sandbags  
 Sandbags/m<sup>2</sup>: " 8 Sandbags  
 Sandbags/m<sup>3</sup>: " 80 Sandbags

40-60 sandbags / men / hour  
 incl. filling, sealing, stapeling

## Sandbags (Approx. values - depends Depending on the sand bag type)

Lengths (m)	Heights (m)	Sand quantity (m <sup>3</sup> ) min-max	Sandbags	
			transvers laid	longitudinal
1	0,5	1	30	45
1	1,0	2 - 3	120	160
1	1,5	4 - 6	260	350
1	2,0	7 - 9	450	580
5	0,5	3 - 4	160	220
5	1,0	10 - 13	600	800
5	1,5	21 - 28	1.300	1.750
5	2,0	35 - 48	2.250	2.900
100	0,5	55 - 70	3.200	4.300
100	1,0	190 - 260	11.800	15.800
100	1,5	420 - 560	25.800	34.500
100	2,0	700 - 930	45.000	57.500

The quantity of sandbags and sand varies according to the way in which the sandbags are laid. All information is only a guideline!

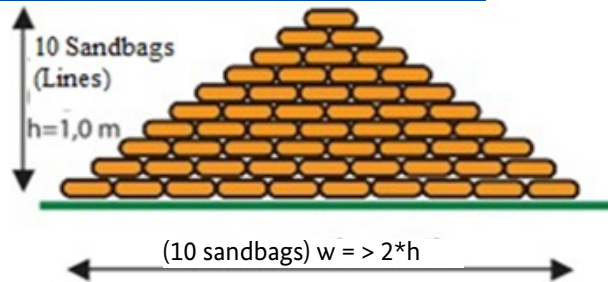
A spreadsheet in Excel format for quick calculation is available at [www.deichverteidigung.de](http://www.deichverteidigung.de)

## Sandbag-Dam

### Sandbag-Dam, normal stability

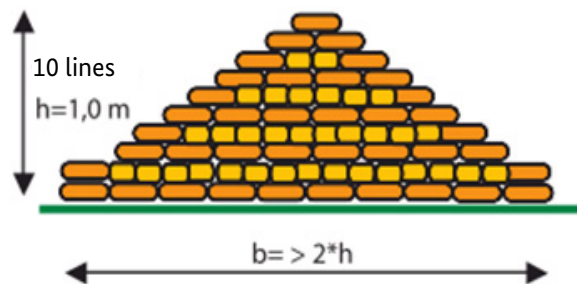
The number of sandbags for the base usually corresponds to the number of sandbags in the heights.

Sandbag h = sandbags w



### Sandbag-Dam, increased stability

Construction with greater dynamics on the dam



**!** The sandbag dam should always be laid in a dense bond so that it is virtually impermeable. The use of film on the water side has also proved its worth.

## Sandbag requirements for creating / heightening a dyke (flood protection)

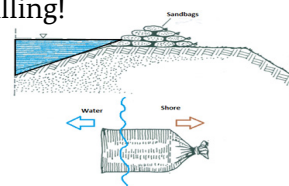
### NOTE:

The following quantities are only guidelines and could vary. Rounding to next 100 / 1000 is recommended!

The following calculations are based on sanbags with the dimensions of 70 cm x 30 cm and a 2/3 filling!

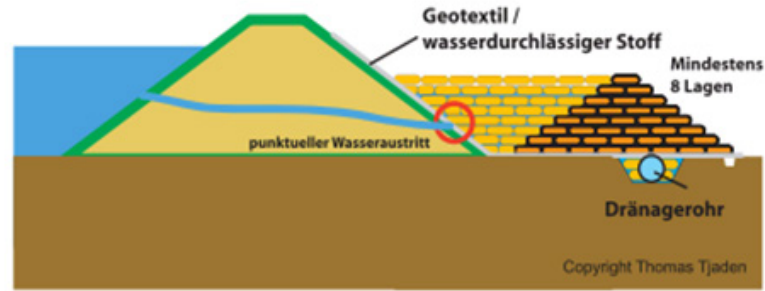
The number of sandbags apply, if the sandbags are laid with the bottom facing water.

A transvers laying increases the numbver of sandbags required by a factor of 1.56.



	Protection height	Number of Sandbags at a Length of		
		10 meters	50 meters	100 meters
	1 Line 10 cm	21	107	214
	2 Lines 20 cm	64	321	643
	3 Lines 30 cm	129	643	1286
	4 Lines 40 cm	214	1071	2143
	5 Lines 50 cm	321	1607	3214
	6 Lines 60 cm	450	2250	4500
	7 Lines 70 cm	600	3000	6000
	8 Lines 80 cm	771	3857	7714
	9 Lines 90 cm	964	4821	9643
	10 Lines 100 cm	1179	5893	11786

## Spring Decade (used by damaged area with punctual water discharge)



Fotos: THW Emden

First you should mark the source through a sandbag to remove the pressure from the source. A geotextile can also be added.

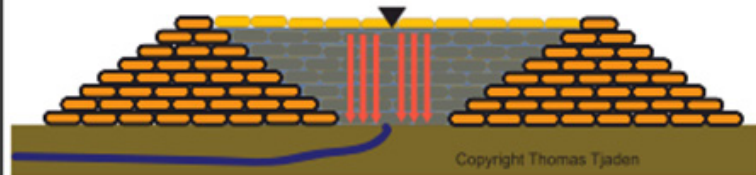
Afterwards, at a distance of about 1 m from the source, 4 sandbags are laid out parallel to the damaged area and at least 4-5 sandbags are placed on the basis of their length.

The sandbags are then connected to the dyke to the left and right. A round end should be reached.

Once the base has been laid, the sandbags of the spring sack are laid according to the same principle as those of the sand sack dam. It is imperative to ensure a tight bond. In this case, the source line can be increased from behind at any time.

The required height of the swell is reached when the water in the swell does not rise any further.

## Spring Decade, Funktion



In the case of selective water leaks behind embankments and dikes, swellings or embankments are used to combat them.

These work according to the principle of „communicating tubes“. A back pressure is generated by the accumulation of the escaping water in the spring decade, which causes the spring to stop after some time. At the same time, this reduces the discharge of sediment from the source to ensure the stability of the dyke structure.

If a foil is applied to the damaged area on the water side at the same time, it can happen that the swelling line runs empty again. This is usually an indication that the water-side film has been used successfully.



Fotos: THW Emden, Dannenberg 2006

## Material for a Spring Decade

For a Spring Decade with a heights of 80 cm, about 800 - 1000 sandbags are necessary

**German Federal Agency  
for Technical Relief**



## Setup of a Sand Filling Area (patterned)

