

# Annex 3

## Roughness of river beds



## Annex 5: Examples of watercourse roughness values



**k = 10 - 15**

Riverbed with thick blocks interspersed with transversal tree trunks. The longitudinal profile shows breaks through thick blocks.



**k = 12- 20**

Bed with thick blocks without major breaks.



**k = 15 – 25**

Mostly flat bed with occasional sediment banks with average rock diameters of about 0,25 m.



**k = 20 – 25**

Flat bed with rock diameter of approximately 0,1 m. Occasionally also larger blocks.



**k = ca. 25**

Rather smooth watercourse bed with fine-grained sediments. Vegetation on the watercourse embankments acts as an obstacle to flow and increases roughness.



**k = ca. 25**

Rather smooth watercourse bed with fine-grained sediments. Vegetation on the channel embankments acts as an obstacle to flow and increases roughness.



**k = ca. 30**

Bed with no sediment, smooth.  
Little influence of the vegetation  
on the watercourse embank-  
ments.



**k = 40 – 50**

Concreted artificial beds and em-  
bankments and embankments  
without transport of sediments.