AquaSust

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Juntai Grille Calculator

Blue block is the design datameter : be filled in

Brown: calculate process data

Red : last result for your process

Average flow rate (L/S)	5	15	40	70	100	200	500	≥	1000
Average batch flow rate (m3/d)	432	1296	3456	6048	8640	17280	43200	≥	86400
Total coefficient of variation	2.3	2	1.8	1.7	1.6	1.5	1.4		1.3

1.Design parameterization

Flow rate (Q)	1500	m3/d	Coefficient of variation Kz	1.998	Maximum flow rate（Q_{max}）	2997	m3/d		
Over-grate flow rate (v)	0.6	m/s	Typical value 0.6-1.0						
Grid gap (b)	0.003	m	Coarse grating: 16-25mm for mechanical removal, 25-40mm for manual removal, up to 100mm Fine grating: 1.5-10mm						
Grid inclination angle (α)	70	°	60-90 for mechanical removal and 30-60 degrees for manual removal						
Bar width (S)	0.001	m							
Water depth in front of the grating (h)	0.3	m							
Gravity acceleration (g)	9.8	m/s2							
Coefficient (k)	3		The number of times the head loss increases when the grating is clogged by dirt, generally used 3。						

Grid section shape	form factor	drag coefficient（ξ）
Sharp-edged rectangle	β=2.42	0.559311428
Semi-circular rectangle at the water surface	β=1.83	0.422950377
Round	β=1.79	0.41370556
Semi-circular rectangle on both the waterfront and the backwater	β=1.67	0.385971109
Trapezoidal	β=2.00	0.46224085
Square	ε=0.64	1.173611111

ξ=β（S/b）^(4/3)

ξ=((b+S)/εb-1)^2

2.Calculation of grille width

Number of grating gaps (n)	62.26903693	63	pcs						
Grid width (B)	0.255	0.3	m						
Width of canal in front of grille (B1)	0.14453125	0.1	m						

3.Head loss through the grille（h1）

Calculate head loss （h0）=ξ*v^2*sinα/(2*g)=			0.009653525	m					
h1=h0*k=	0.028960576	m							

4.Total height of groove behind fence（H）

H=h+h1+h2=	0.628960576	0.63							
h2——Excessive height of the channel in front of the fence, generally taking the value of		0.3	m						

5.Total length of grid channel（L）

Expansion angle of the shoulder-width portion of the intake channel α1=		20	°						
Length of the shoulder -width portion of the intake channel l1=		0.549495484	0.55	m					
Length of tapering portion l2=	0.275	m							
Depth of the channel in front of the grate (H1)	0.6	m							
L=	3.973486452	4	m						

6.Daily slagging capacity（W）

slagging rate W1=	0.1	——	0.05	Gap of 16-25 hours					
	0.03	——	0.01	Gap of 30-50 hours					
W=	0.15	m3							