

城镇污水处理厂污泥处理处置技术指南

.....	1
.....	2
.....	4
.....	4
.....	5
.....	7
.....	13
.....	13
.....	15
.....	23
.....	30
.....	35
.....	37
.....	39
.....	39
.....	44
.....	58
.....	60
.....	63
.....	63
.....	65
.....	68

1

2

3

4

“ ”

5

1

m³ 80% 5~10 t

2

2.1

97 ~98
99.2 ~99.8 94 ~96
80%
m/kg
20~60 × 10¹² m/kg 100~300 × 10¹² m/kg
40~80 × 10¹² m/kg 1 × 10¹¹ m/kg 1 × 10¹³ m/kg

2.2

TEL 20~60 20~60

2-2

2-2

	/ MJ/kg
	15~18
	8~12
	5~7

2006 140

2-3

2-3 2006 140 mg/kg

	Cd	Cu	Pb	Zn	Cr	Ni	Hg	As
	2.01	219	72.3	1058	93.1	48.7	2.13	20.2
	999	9592	1022	30098	6365	6206	17.5	269
	0.04	51	3.6	217	20	16.4	0.04	0.78

2.3

2-4

2-4

	10 ⁵ /g	10 ⁵ /g	10 /g
	471.7	158.0	23.3 78.3%
	738.0	12.1	17.0 67.8%
	38.3	1.2	13.9 60%

1

90

220 t 120 t 85 t

40% 60%

60%

2009

1992

280

ĩ

ũ ū

~~ÉPILOGUE~~
~~ÉPILOGUE~~

3

5

1

1.1

GB/T24600

GB/T

23486

CJ/T 309

1.3

GB/T 23485

2

2.1

2.2



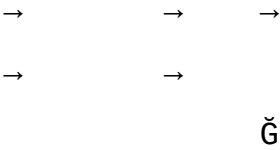
2.3



2.4



2.5





3

Inventories Vol 5 Waste

400~600

kg

IPCC

3-2

3-2

+			
+			
+			
+			
+			

1

94 ~96

80

2

3

3.1

УЧЕБНИК

– â Ã Ã ´ Ê ½ % òK–a– ’,ï ä\0æ]Ó€“•EĐ 3À• ‡ â â
‡ g â 8 8 [Ê – â e!–

95 ~99.5

75 ~80

97

65 ~75

95

~99.5

75 ~80

4

55 ~65

78 ~85

5

1

1

2

3

GB18918

2

3

3.1

1

2.0~4.0 kg/m³·d

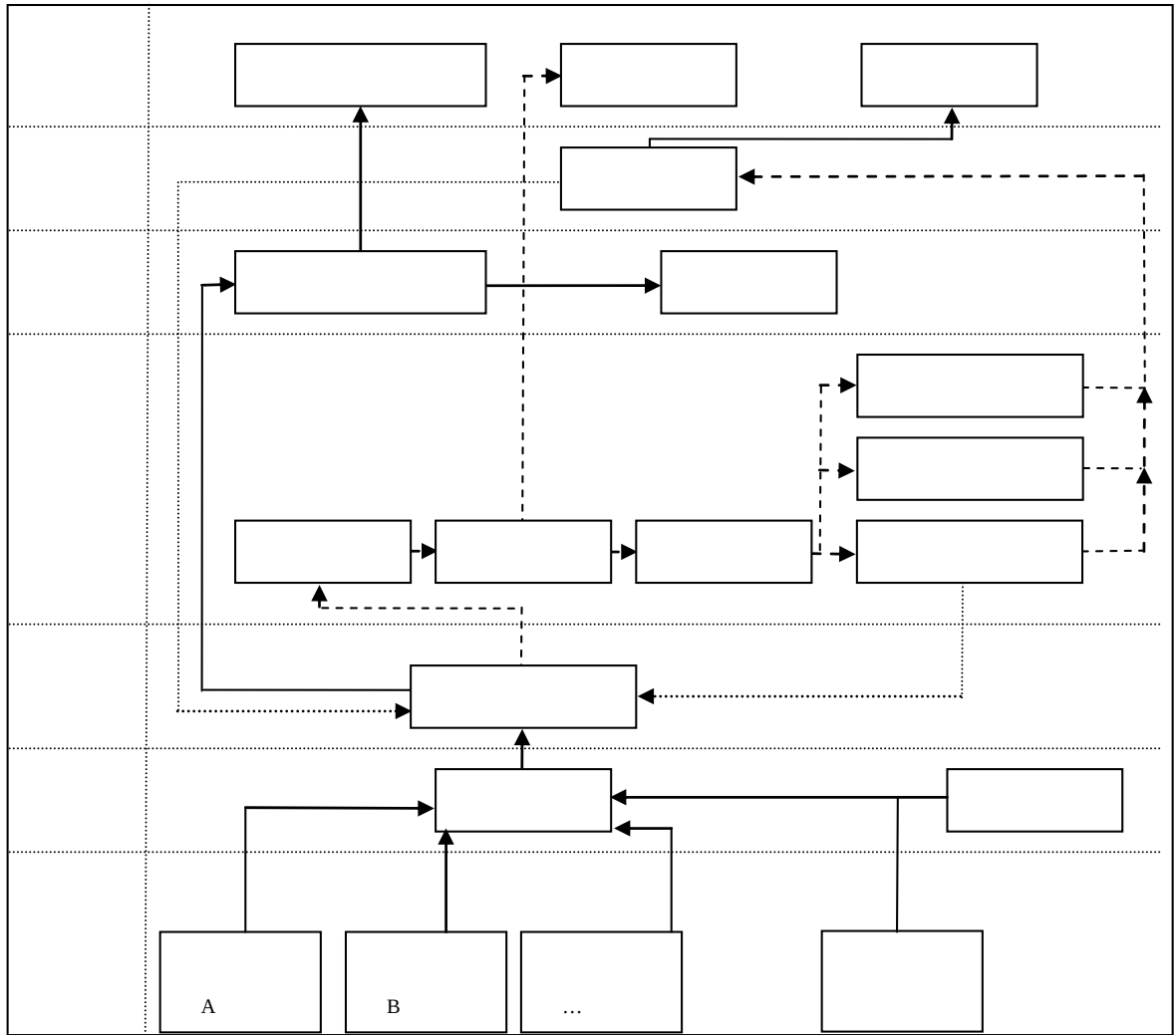
2

3.2

20d

0.75~1.10 N m³/kgVSS

35%~45%



bar	15%~20%	155 ~170	6
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4-3

301940f3TCH0 1 7.9856.7 7.985170402 493.7 Tc <0.4210b7(40 1 Tf 12 0 0 12 56.7 755

NaOH Na₂CO₃
H₂S

3

60%~70%

90%~95%

90%~95%

4.3

90%~95%

1

Nm³

1.5~2.2 kWh

40%~50%

5

5.1

1

10%

2~3

2

24h

7

GB 50058

8

9

GB 50016

GB 50160

6

6.1

300~2000 mg/L

70~200 mg/L

SO₂ NO_x

7

20~40 /t

80%

60~120 /t

80%

0.05~0.10 /t

1

55

2

3

3

1~2 m

3~5 m

5°

2~3 m

4

3.3

1 —

40~50 m³/h

2 —

4.5~5.0 m/min 1.5~2.0 m

—

3

250~300 m³/h 5 m

2 m 1.5 m/min

4.5~5.0 m/min

4

5

6

NH_3 H_2S

NH_3

H_2S

7

3.4

CO_2

1.5~2.5 m

4~7 m

4

C/N

≤

20 mm

55%~60%

≥ 35%

C/N

20:1~30:1

pH

6.0~8.0

C/N

4.2

1

2

5%

3.0 m

2 m

C/N

3

5%

55

6d

7d

4-2

4-2

	95% 0.01
	0.2 O ₂ % /min ~0.3 O ₂ % /min
	45%
	60%

4.3

45

30~50d

4-3

4-3

	0.1 O ₂ % /min
	45%
	80%

5

1

H₂S NH₃

CO₂ CO NO_x

H₂S NH₃

GBZ1

GBZ2

GB 14554

2

12h

30d

6

25~45 / t

80% · d

120~160 / t

80%

150~200 m²/ t 80%

1

2

3

3.1

4-5

4-5

3.2

1

2

1

40

65

<10%

15%~40%

15%

3~5 mm

1000 kg/h

30 t/d

80%

5000 kg/h

150 t/d

80%

3

<80

<10%

150 ~220

10 mm

8000 kg/h

240 t/d

80%

4

105

100

<10%

200 ~ 300

30

1000~7500 kg/h

30~225

t/d

80%

5

100 ~40

<5%

250 ~300

30%~40%

1~5 mm

3000~10000 kg/h

90~300 t/d

80%

30~150μm

400 ~500

70 ~90

70

20~120 μm

5~12000 kg/h

360 t/d

4

4.1

1

2

5

10~20 /t 80%

30~40	/t	80%
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4-4

4-4

	720 kcal/kg	100~200 kWh/t
	760 kcal/kg	50~55 kWh/t
	688 kcal/kg	50~80 kWh/t
	688 kcal/kg	50~60 kWh/t
	690 kcal/kg	50~60 kWh/t
	850 kcal/kg	80~100 kWh/t

1

1 pH

pH ≥ 12

2 5 ~30 80

74.0 ~48.2

3

4

2

3

3.1

4-6

3.2

1

2

3

4

30 ~50

4

1

30

4-5

4-5

pH

22.7%

	%	30	%		pH
			50		
1	2	28	30.8	33.1	12.5
2	4.6	30	35.9	38.0	12.6
3	6.9	43	39.2	41.4	12.6
4	9	45	48.1		12.6
5	11	58	51.7		12.6
6	14.4	59	54.8		12.6

2

5~10d

5

2~4

/t

80%

50~150

70 ~90

1

1

2

3

1

N+P₂O₅+K₂O

20 g/kg

200 g/kg

40 g/kg

240 g/kg

30 g/kg

200 g/kg

2

CJ/T309

A

B

A

B

CJ/T 291

3

10 mm

5 mm

0.8 g/cm³

60% 40%

3 ms/cm pH

6.0~8.0

4

60%

50%

75%

5

95%

0.01

4

4.1

4.2

4.3

1

¿ º - ®
4~8 kg/m² ¯ ¯
30~40d

2

50%~70%

3

kg/m² 4~8 kg/m² 8~10

4

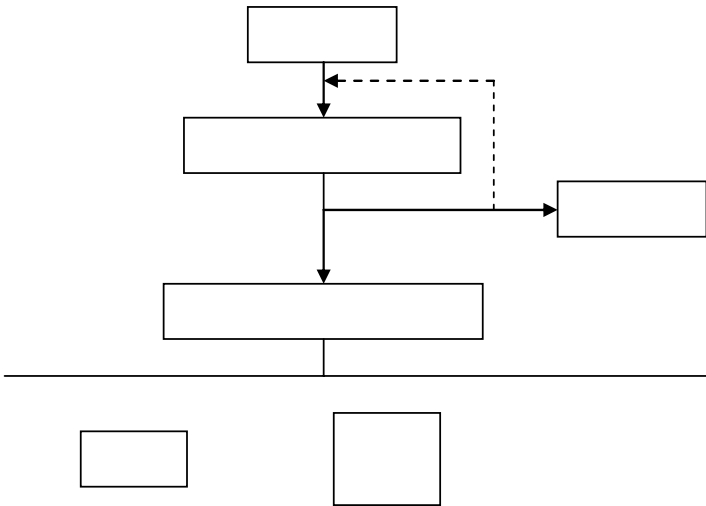
6~8 kg/m²

5

5~10 kg/m² 12 kg/m²

6

3 kg/m²



5.2

50 ~60

55 5~7d

5.3

5.4

NaCl 20~40

5.5

1km

5.6

15° 15°

5.7

6
COD α

PAHs

5.8

1

1.1

1

$Q_{ad, net}$ kJ/kg

M_{ar} %

5-1

$$Q_{ar, net} = (Q_{ad, net} + 23M_{ad}) \frac{100 - M_{ar}}{100 - M_{ad}} - 23M_{ar} \quad 5-1$$

$Q_{ar, net}$ — M_{ar} % kJ/kg

$Q_{ad, net}$ — kJ/kg

M_{ad} — %

$M_{ad}=0$

2

5-2

$$A_2 = A_1 \cdot \frac{100 - M_1}{100 - M_2} \quad 5-2$$

A_1 — kg/h

M_1 — %

A_2 — kg/h

M_2 — %

3

5-3

$$q_{gh} = (A_1 M_1 / 100 - A_2 M_2 / 100) \cdot \frac{C_v \cdot (T_2 - T_1) + r_{T_2}}{\eta_{gh} / 100}$$

q_{gh} — kJ/h

C_v — 4.187 kJ/ kg

T_1 — 20

T_2 — 100

r_{T_2} — T_2 2261 kJ/kg

η_{gh} — %

4

5-4

$$q_{gl} = A_2 \cdot Q_{2,ar,net} \cdot \eta_{gl} / 100$$

5-4

q_{gl} —

kJ/h

A_2 —

kg/h

$Q_{2,ar,net}$ —

kJ/kg

η_{gl} —

%

$q_{gl} >$

q_{gh}

$q_{gl} <$

q_{gh}

q_{gh}

q_{gl}

kJ/h

80%

40%

85%

13510 kJ/kg

3227

kcal/kg

5

CJ/T 290

1

NO_x SO₂ t #

2.2

2.3

2.4

60%~85%

1

2

3

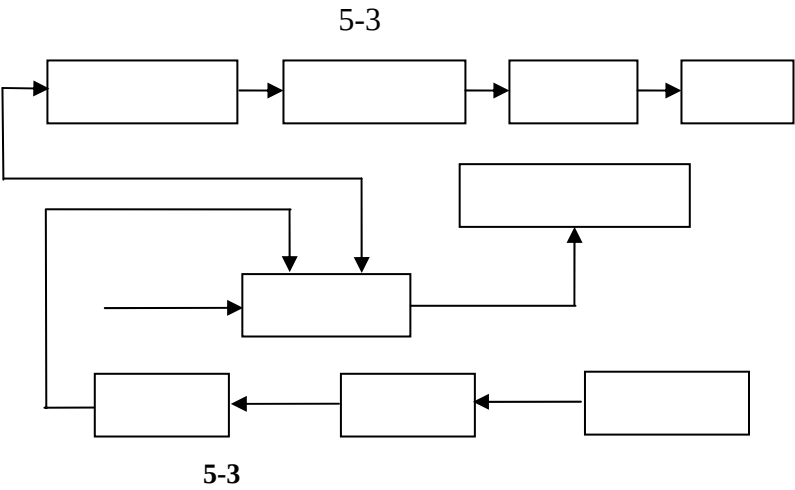
4

80%

40%

3.4

1



2

850

3.5

1

5-4

5-4

2

40%

850

3.6

40%

3

GB 5085

4

GB 8978

5

GB 3096

GB 12348

GBJ 87

3.7

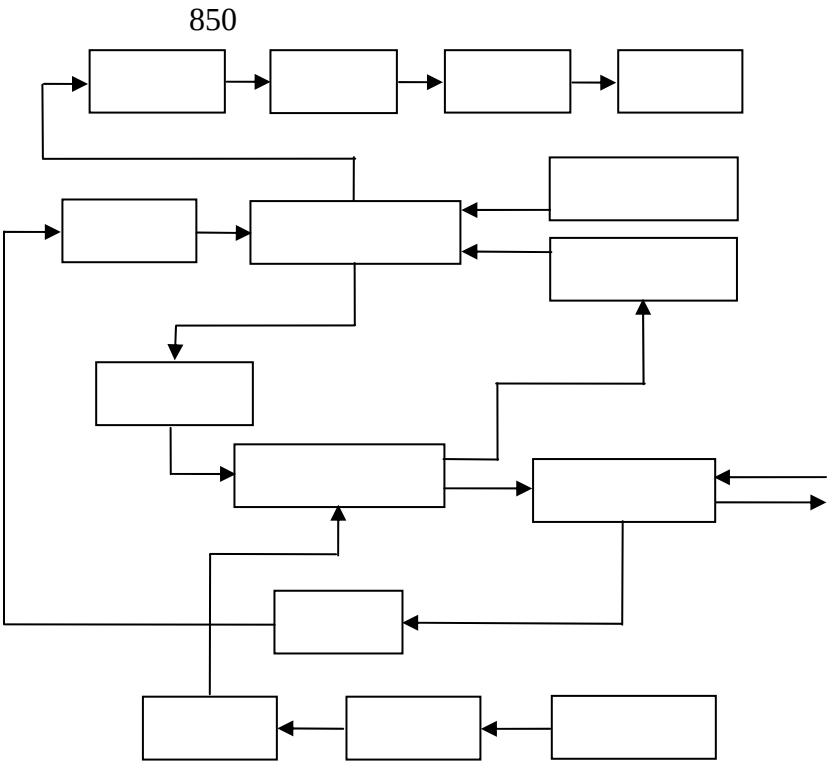
4.2

4.3

1

5-5

2



5-5

4.4

1

GB

14554

2

GB 18485

3

GB 18485

4

GB

8978

5

GB 3096

GB 12348

GBJ 87

4.5

10~15 / t

80%

30~40 / t

80%

100~180 / t

80%

55~60kWh/ t

80%

ävuP³..uWP5...P1Qñ@P...W6no1sC6Q%(âar@Pb@E14x

	ug/L		
Cu	50	100	300
Zn	50	100	300
Ni	4	50	200

5-3

	≤ 3	≤ 2
	≤ 1	≤ 0.5
	≤ 5	
	≤ 5	
SO ₃	≤ 1.0	
		GB/T 17431.2 19.6.3
%	≤ 0.02	
	GB6566	

1.3

1

5-4

5-4

	SiO ₂	Al ₂ O ₃	Fe ₂ O ₃	CaO+MgO	K ₂ O+Na ₂ O
	48~79	8~25	3~12	1~12	0.5~7

$$F_{2\ 3} = \frac{SiO_2}{2} \quad \frac{Al_2O_3}{2}$$

→ → → → → → → → → → →

→

3

80%

80%

30%

1100 ~1200

1.4

GB 18485

1.5

30

250~300 /m³

5%~10%

1100

3

Ý · 20 @

1.5

! ± ´

4d

2

2.1

GB/T 23485

GB 16889

2.2

1.0 kg/m³

20~30 cm

1.0×10⁻⁷ cm/s

20~30 cm

20~30 cm

20 cm

80 cm

5%

CJJ 17

3

3.1

GB/T 23485

GB 16889

5-5

1

1

2

5~7 d

5

6

2.2

1

0.5m

2

3

4

5

6

5

1

1.1

1

2

3

180

1.2

1

60

2

3

“ ”

GB 50016

2

2.1

3

100 m

300 m

300 m

1	
2	CJJ 27
3	GB 50014
4	
5	AQ 3028
6	GB 50058
7	GB 50160
8	GB 7959
9	GBZ1
10	GBZ2
11	GB 14554
12	GB 8978
13	GB 3096
14	GB 12348
15	GB 16889
16	CJJ 17
17	GB 18918
18	[2001]101
19	GB 18485
20	GB 5085
21	GB 4915
22	GB 18484
23	2000/76/EC
24	GB/T 17431.1
25	GB 5101
26	GB 13544
27	GB 13545

28		CJJ/T 80
29	CJ/T 3073	
30		GB 18598
31		
32		
33		
34	GB 5750	
35		HJ/T 164
36	GB 15618	
37		HJ/T 166
38	GB 2893	
39	GB 2894	
40		GB 13223
41		CJ 3082
42		GB24188
43		GB/T 23486
44		GB/T 23485
45		GB24602
46		GB24600
47		CJ/T289
48		CJ/T309
49	GB 50016	
50		GB/T23484

