



1

30

2

3

4

5

6

7

8

	13912189896		-		223600
				2019-321322-30-03-60603 5	
				[C3099]	
	5539.91m ²			1000m ²	
()	500	()	26		5.2%
()	-			2020	10
()			()		
1-1					
1-3					
/	384		/		/
/	12		Nm ³ /		/
/	/		/		/
丰 96m ³ /a					
2052m ³ /a					

1

1-1

1-1

			t/a			t/a	
1			1000	1000	0	100	
2		HCl 36.5% 住 丰	0	150	+150	10	
3		HF 40% 住 丰	0	6	+6	0.5	

1-2

	CAS				
	7647-01-0	36.46	HCL 丰		会

7664-39-

1-3

			/			
1		45W	1	1	0	
2		5t/h	1	1	0	
3		/	1	1	0	
4		/	1	1	0	
5		/	1	1	0	
6		2t	0	1	+1	
7		/	0	1	+1	
8		/	0	1	+1	
9		/	0	1	+1	
10		/	0	1	+1	

()

1

2011 08 16

5539.91m²

500

2011 12 13

[2011]289

2012 06 15

[2012]17

丰

价

500

丰

500

[2015]118

2012

2012

2013

2013

4

[2018]90

丰

丰

丰

丰

5

1

2020《

1

15

811

2

依 5.76km

1-4

1-4

1			5.76km		100

[2018]74

丰

8

2

2019

丰

HF

GB3095-2012

HCl

HJ2.2-2018 D

(GB3838-

价

[2015]19

[2014]209

〉2018《 141

1-5

1) (2019)	丰 (2019)
2		
3	2012	丰 2012
4	2012 2012	2012 2012
5	2013	2013 2013
6	[2015]19	[2015]19
7	[2014]209	[2014]209
8	〉2018《 141	〉2018《 141
9		

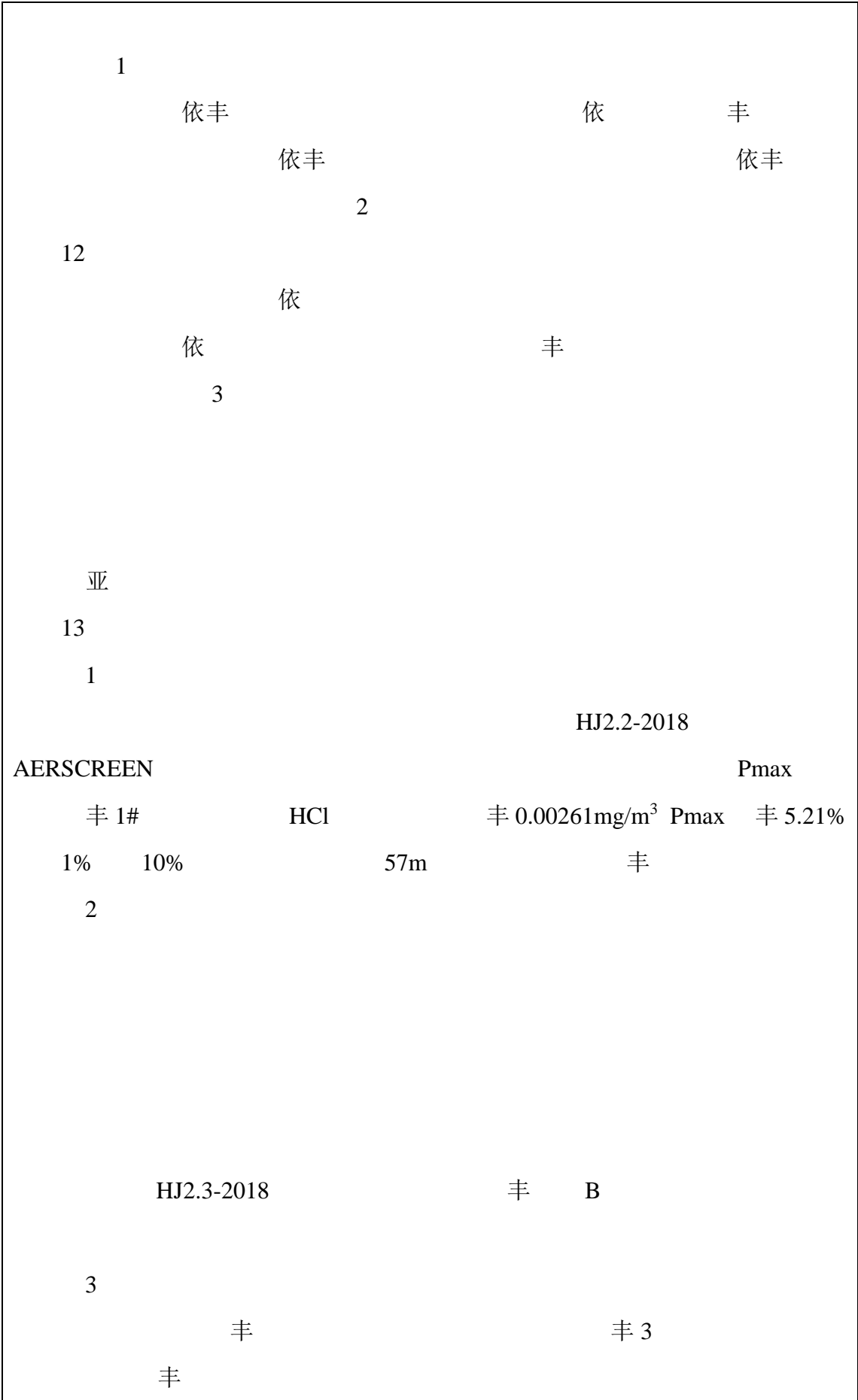
6

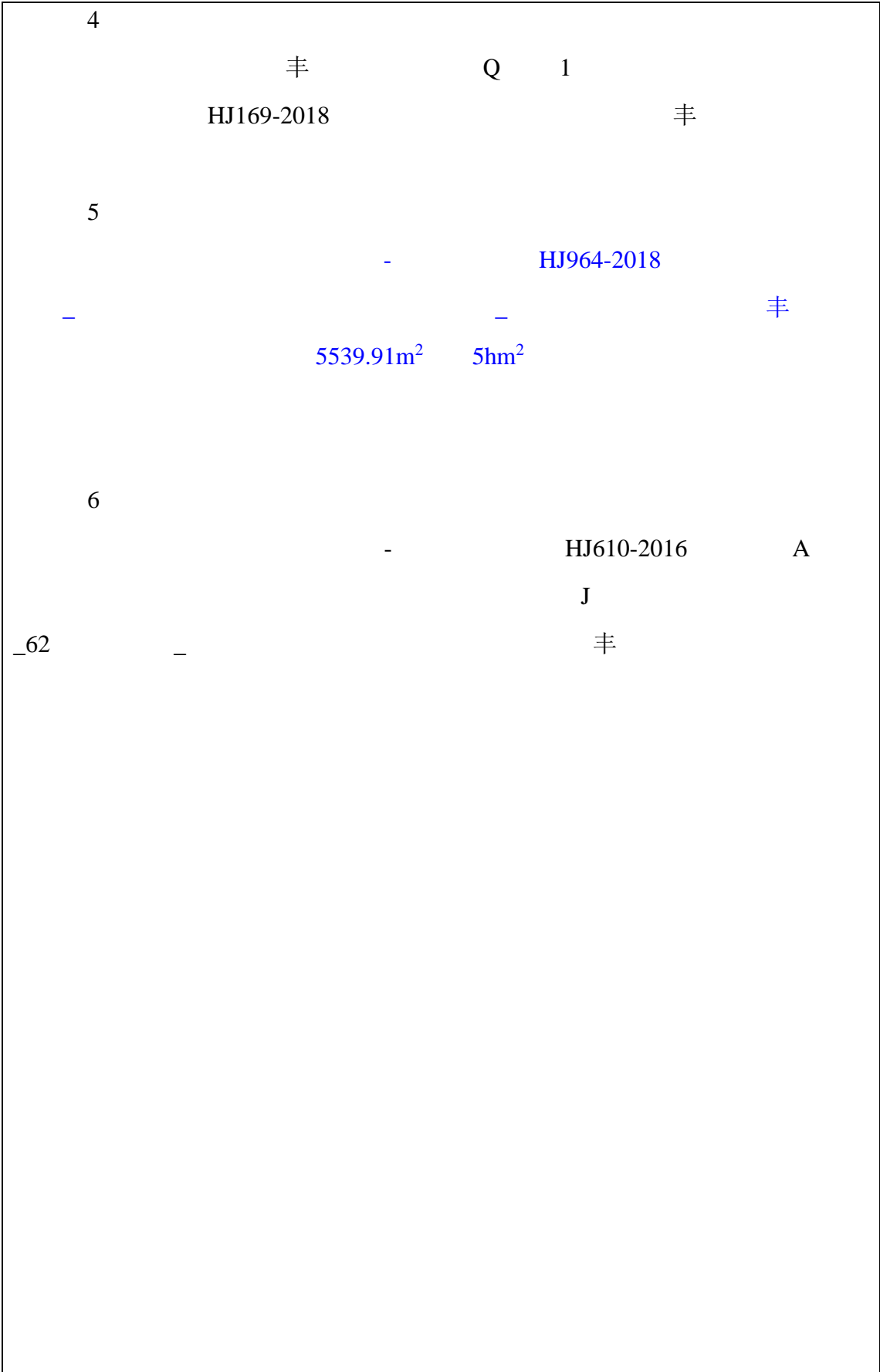
1-7

		785m ³ /a	1169m ³ /a	+384m ³ /a
		0	0	
		10.4 /a	22.4 /a	+12 /a

430m³/

9						
		26		5.2%		1-9
1-9						
		COD SS NH ₃ -N TP		GB/T25499-2010		
		pH COD SS	10m ³ /d	GB/T19923-2005	10	
		HCl HF	+	GB16297-1996	5	
		HCl HF			-	
				价 GB12348-2008 3	2	
					2	
					/	
					-	
					2	
					5	
					-	
					26	
10						
		8		20		28
		300 8 /		2400h		
11						





2011 08 16

5539.91m²

500

2011 12 13

[2011]289

2012 06 15

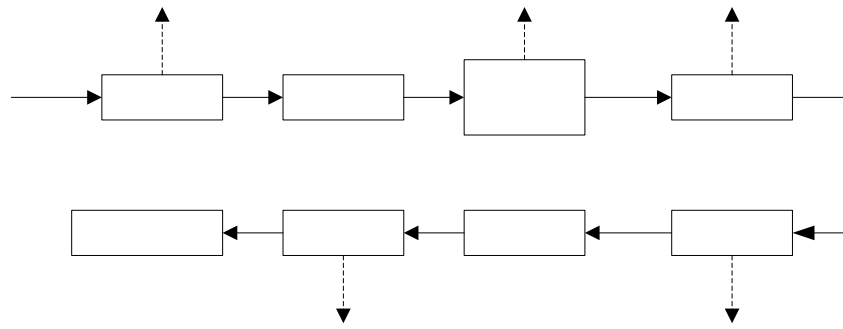
[2012]17

20

8

300

1



1-1

930

2

1 丰

丰 50-160

G₁₋₁

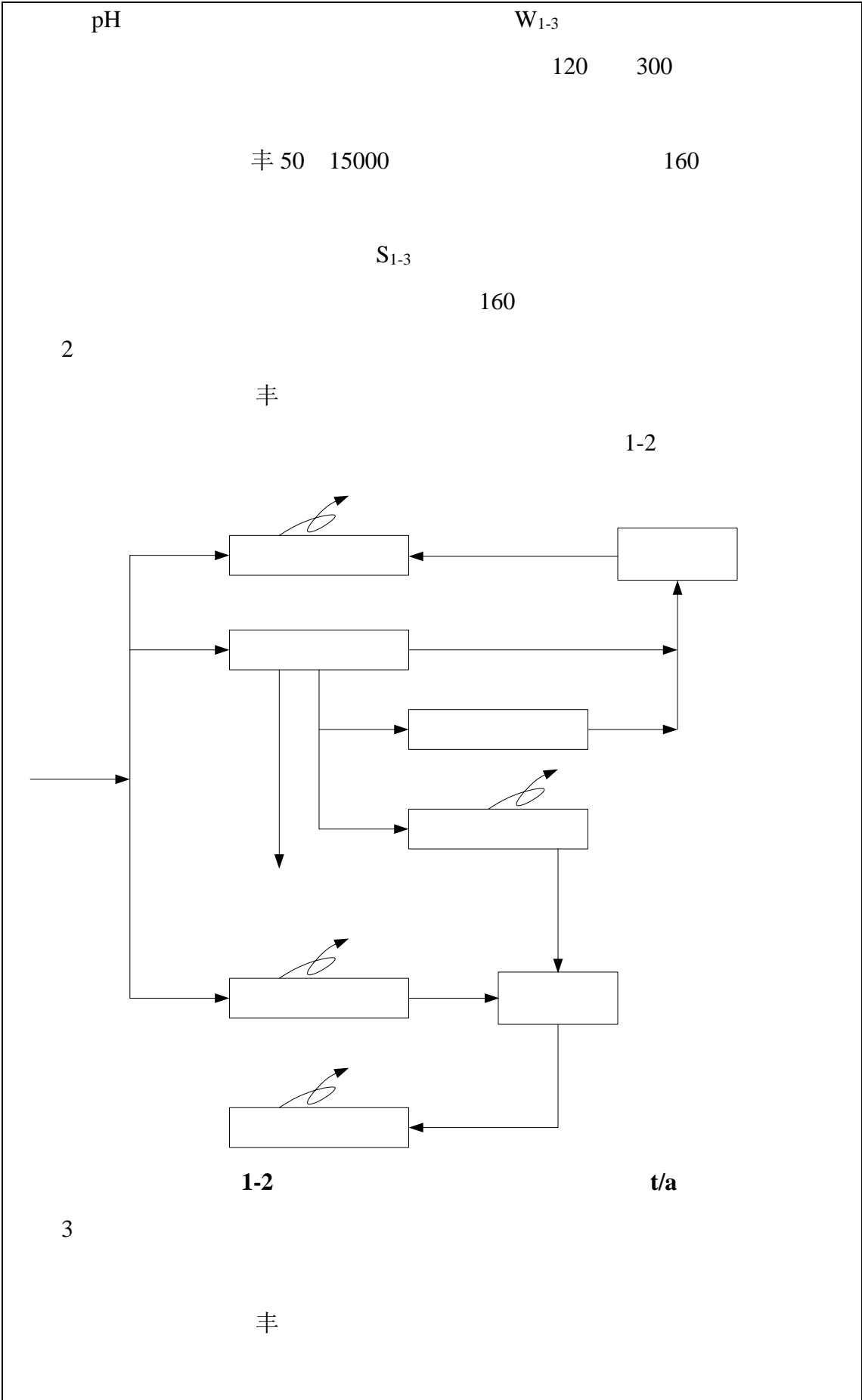
W₁₋₁

≦

1

W₁₋₂

S₁₋₂



2012 018 2012
 4 18 4 19 TSP 丰 0.52mg/m³ 0.56mg/m³
 GB16297-1996 2
 1.0mg/m³

丰

丰

丰

≦

2012 018
 2012 4 18 -4 19 1-10
1-10

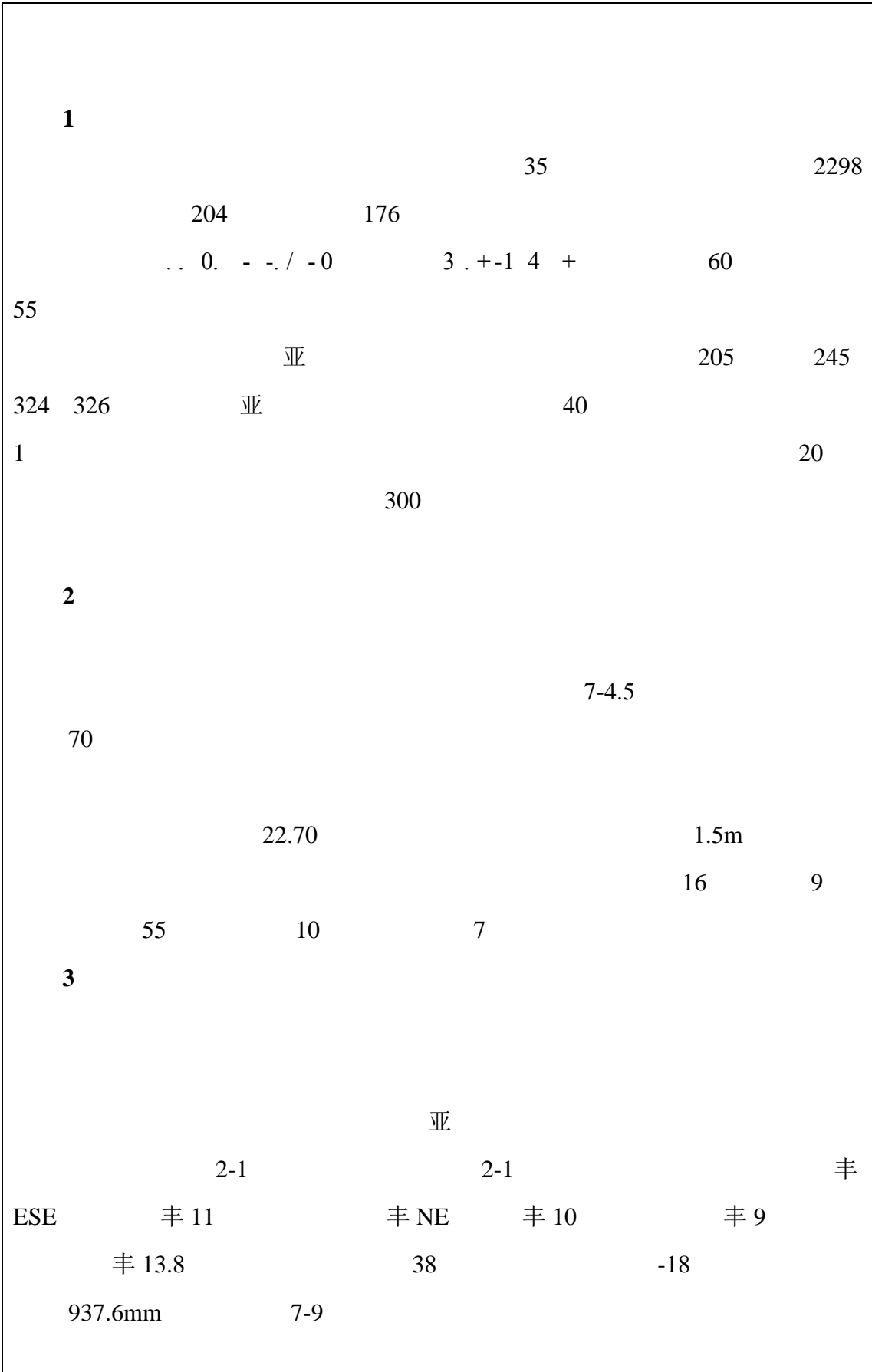
	Leq dB A			
	4 18		4 19	
1	58.3	51.0	61.3	50.8
2	59.1	50.7	60.5	51.4
3	57.6	50.6	62.0	51.0
4	58.5		61.2	49.7
5				

4

1-11

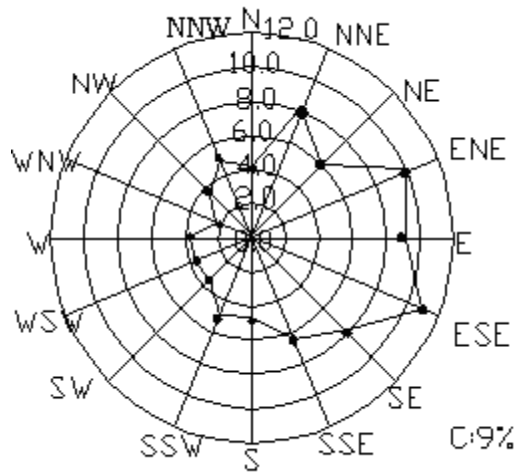
		96	96	0	0
	COD	0.028	0.028	0	0
	SS	0.018	0.018	0	0
		0.0018	0.0018	0	0
		0.0003	0.0003	0	0
		354	354	0	0
	COD	0.011	0.011	0	0
	SS	0.1	0.1	0	0
	()	10	9.9	0.1	0.1
		0.0054	0.0032	0.0022	0
		6	6	0	0
		360	360	0	0
		138.9	138.9	0	0

5



2-1

		13.8
		38
		-18
	m/s	2.39
	mbar	1015.9
		75
		76
		1580.3
		458.7
		937
		42
		1
		8
		SE10.71%



2-1

4

29

60

59.14

1100

1400

70

丰 6000

/

7000

/

10.76

4.25

丰

75

丰

丰

丰 0

丰 0.0696

5

丰 85

丰							
2019		24633	950.17			47.9	
						248.61	
			2019				
			2019	84		75	
	72			1.08		884.76	
	25.17			39.52		18.97%	
10.56%	12.30%					360	270
180			价	154	10	价	9
价	1						
							2019
		248.6					
价	2					2.91	
	69%					45.5%	45.3%
		1089.7			15		
	64		价	16			

临

·

+

3.4

3000

300

1920

[2018]90

1

丰

依

1418

94.53

2

丰

丰

3

丰

丰

丰

丰

丰

丰

9~12m

1

1

2019 丰

2019

3-1

3-1

g/m³

				%	
SO ₂		17	60	28.3	
NO ₂		33	40	82.5	
PM ₁₀		104	70	148.6	
PM _{2.5}		44	35	125.71	
O ₃	8	120	160	75	
CO	24	827	4000	20.7	

2019

O₃

8

CO 24

GB3095-2012

PM₁₀

PM_{2.5}

GB3095-2012

丰

丰

≡

2

HCl HF

丰 2018 6

353m

3-2

3-2 HCl

		ug/m ³	ug/m ³	%	
HCl	1	40	50	80	
HF	1	ND	20	2.25	

丰0.9×10⁻³ mg/m³

HF

GB3095-2012

HCl

HJ2.2-2018

D

2

2019

2019

丰

(GB3838-2002)

(GB3838-2002)

NX-BG-HJ2018060793

丰

20m W1

500m W2

200m

1100m W3

亚

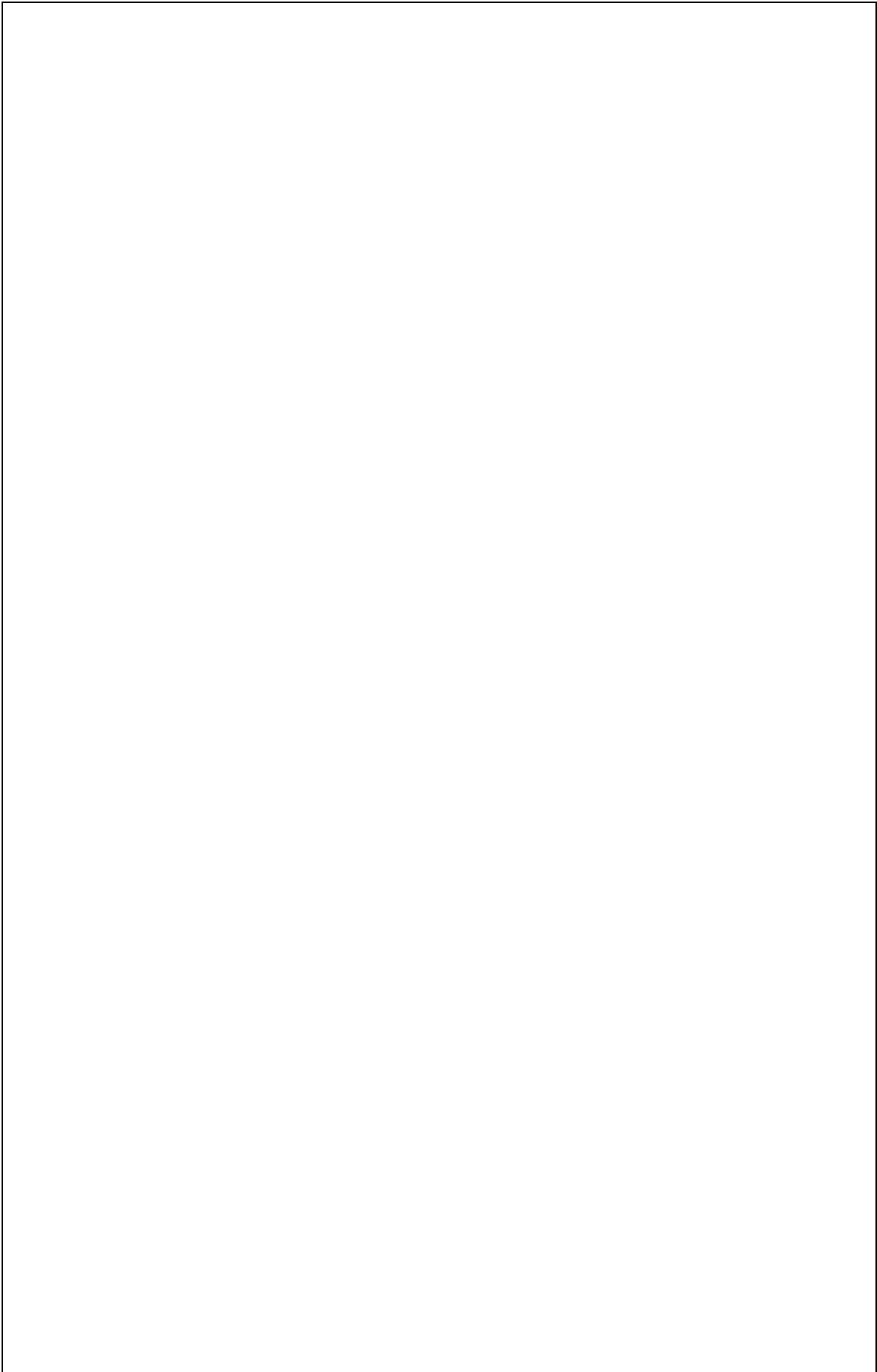
200m W4

丰 2018 9 11

3-3

3-3

pH DO COD BOD₅ mg/L pH SS



3-5

			m		
		N	3100		GB3838-2002
		N	220		
		E	1420		
		W	5	30	GB3096-2008 2
		W	80	3	
		S	5760	100	

GB3095-2012

4-1

4-1

		$\mu\text{g}/\text{m}^3$	
SO ₂		60	GB3095-2012
	24	150	
	1	500	
NO ₂		40	
	24	80	
	1	200	
NO _x	24	100	
	1	250	
TSP		200	
	24	300	
PM ₁₀		70	
	24	150	
PM _{2.5}		35	

4-3

4-3

LAeq:dB

	dB A	dB A
3	65	55

1

GB16297-1996 2

4-4

GB16297-1996 2

	mg/m ³	kg/h				
		m			mg/m ³	
HCl	100	15	0.26		0.20	GB16297-1996
HF	90	15	0.10		0.02	

2

丰

丰

GB/T 19923-2005

GB/T 25499-2010

4-5

4-5

	mg/L	mg/L
pH	6.5~8.5	6~9

4-6			
		mg/L	mg/L
1	pH	6-9	6~9
2	SS	400	10
3	COD	500	50
4	TP	1	0.5
5		25	5 8 *
6		/	15
7	LAS	20	0.5

GB18918 2002
A

* 丰 12 丰 -

3

价

GB12348-

2008 3 4-6

4-6 价

	dB A	dB A	
3	65	55	价 GB12348- 2008

4

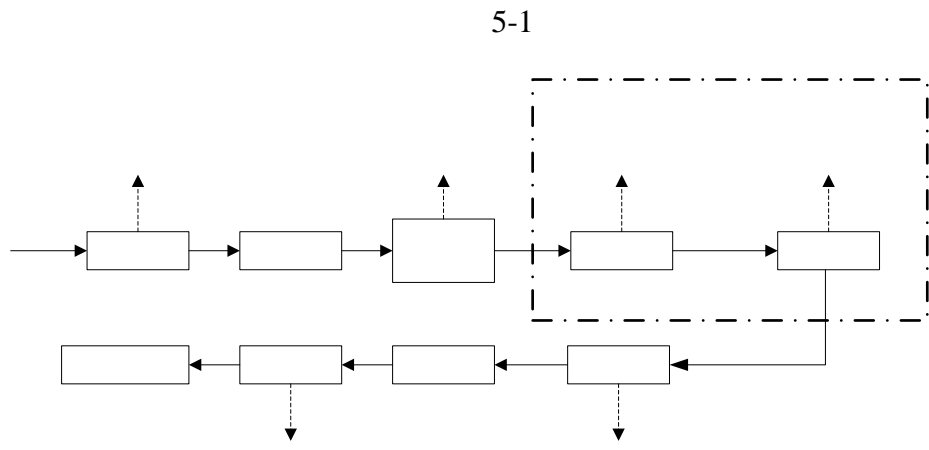
GB18599-2001

2013 36

GB18597-2001

2013 36

4-7									
4-7					t/a				
	HCl	0	0.052	0.049	0	0.003	+0.003	-	0.003
	HF	0	0.0001	0.000095	0	0.000005	+0.000005	-	0.000005
		0.1	0	0	0	0	0	-	0.1
	HCl	0	0.0005	0	0	0.0005	+0.0005	-	0.0005
	HF	0	0.00004	0	0	0.00004	+0.00004	-	0.00004
	(m ³ /a)	0	2052	2052	0	0	0	0	0
	COD	0	0.112	0.112	0	0	0	0	0
	SS	0	1.868	1.868	0	0	0	0	0
	(m ³ /a)	0	96	96	0	0	0	0	0
	COD	0	0.034	0.034	0	0	0	0	0
	SS	0	0.029	0.029	0	0	0	0	0
		0	0.002	0.002	0	0	0	0	0
		0	0.0003	0.0003	0	0	0	0	0
		0	0	0	0	0	0	-	0
		0	10.2	10.2	0	0	0	-	0
		0	1.2	1.2	0	0	0	-	0
<p style="text-align: right;">丰 HCl 0.003t/a HF</p> <p>0.000005t/a</p> <p style="text-align: center;">丰</p>									



5-1

1

HCl HF 丰 12:1 EDI
 HCl 28% HF 2% 4h
 G2-1 W2-1

2

丰 EDI
 W2-2

1

1

依

2t

HCl HF

HCl 28% HF 2%

4

$$Gz=M(0.000352 +0.000786V)P* F$$

Gz kg/h

M

V

m/s

丰

0.2 0.5m/s

0.3m/s

P

mmHg

20

28% HCl

4.00mmHg 2% HF

0.022 mmHg HF

10%

丰22mm mmHg

HF

丰

10%

4-15

10%

4-11 4-12 4-13 4-14

F

m²

5-1

5-1

		M	V	m ²	%		mmHg	kg/h
	HCl	36.5	0.3	0.5	28	20	4.00	0.043
	HF	20	0.3	0.5	2	20	0.022	0.0001

5-2

5-2

			kg/h	t/a
		HCl	0.043	0.052

5.2m³

KN

K

丰 7 2

F .1 KN=1

.17F -- + KN=11.467×K-0.7026

K>220 KN=0.26

5-3

	M	P	H	ΔT	FP	C	KN	KC	D
	36.5	106.4 Pa	1.0m	10	1.3	0.326	1	1	2m
	20	106.4 Pa	0.6m	10	1.3	0.252	1	1	1.2m

5-4

	kg/a	kg/a	t/a
	0.318	0.207	0.0005
	0.035	0.005	0.00004

丰32 4m*8m

5-3

		m ³ /h	mg/m ₃	kg/h	t/a		%	mg/m ₃	kg/h	t/a
1#	HCl	10000	4.300	0.043	0.052		95	0.217	0.002	0.003
	HF		0.010	0.000 1	0.000 1		95	0.0005	0.00000 5	0.00000 5

5-4

		t/a	kg/h	m	m	m
	HCl	0.0005	0.00007	8	4	4
	HF	0.00004	0.000006			

2

丰

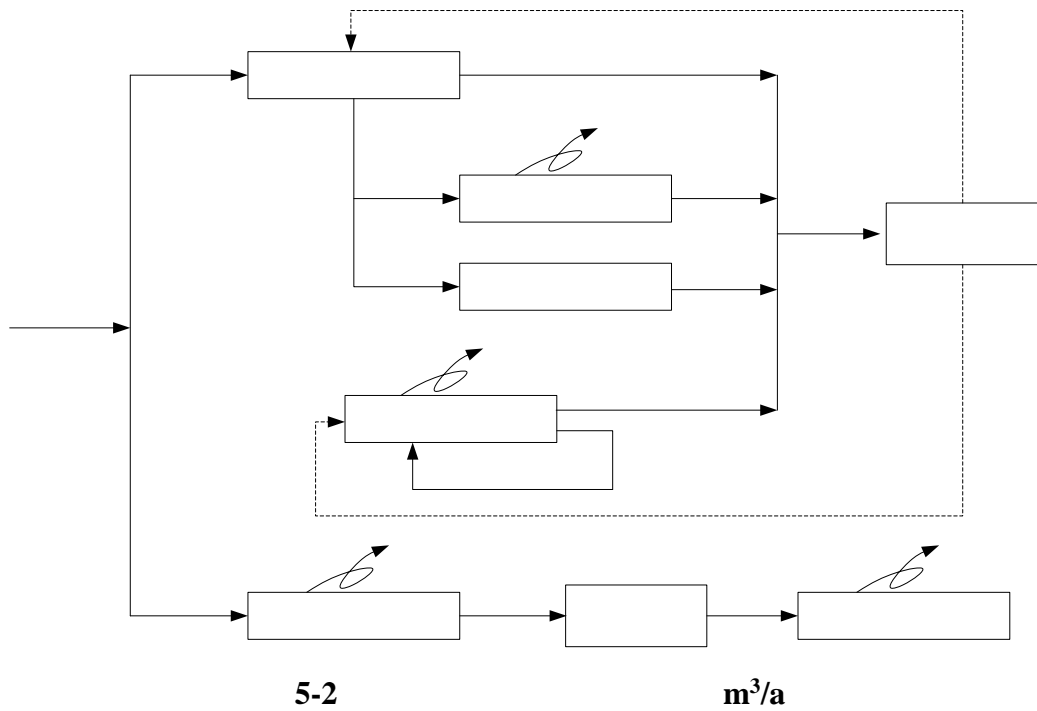
1							
					1	EDI	
							丰 150t/a
	丰 6t/a			28%			2%
		160m ³ /a		15%			
住				丰 136m ³ /a		丰 pH	COD
SS							
价				2m ³		2	
		1200m ³ /a				丰pH	COD SS
			1360m ³ /a		1	EDI	
丰 5m ³ /h		丰 66.7%		丰 2040m ³ /a			680m ³ /a
2							
			1				
	丰 5m ³ /h	2400h		丰 12000m ³ /a			
2%	240m ³ /a						1.5m ³
	丰 36m ³ /a			276m ³ /a			
3							
		8		300			
	GB50015-2019		50L/	d		丰 120t/a	
0.8			丰 96t/a			丰 COD 350mg/L	SS
250mg/L	30mg/L		3mg/L				
				5-1			
				5-1			
			mg/L	(t/a)	(t/a)	(t/a)	
			COD	350	0.034	0.034	0
			SS	300	0.029	0.029	0
				25	0.002	0.002	0
				3	0.0003	0.0003	0

	136	pH	1-2	-	-	0	
		COD	100	0.014	0.014	0	
		SS	200	0.027	0.027	0	
	1200	pH	4-5	-	-	0	
		COD	50	0.060	0.060	0	
		SS	1500	1.800	1.800	0	
	36	pH	9-11	-	-	0	
		COD	100	0.004	0.004	0	
		SS	200	0.007	0.007	0	
	680	COD	50	0.034	0.034	0	
		SS	50	0.034	0.034	0	
	2052	pH	2-10	-	-	0	/
		COD	54.6	0.112	0.112	0	
		SS	910.3	1.868	1.868	0	

[1]pH

[2]

5-2



3

5-2

5-2

		/	dB A		
--	--	---	-------------	--	--

1		1	80	2#	
2		1	75	2#	
3		1	85		
4		1	75		
5		1	85	2#	

4

丰 RO

8 0.5kg/ 1.2t/a

10t/a

0.1t/a

≤ RO

EDI

0.1t/a

GB34330-2017

丰

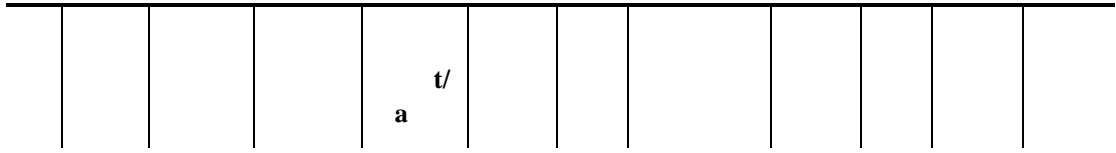
GB34330-2017

5-7

5-7

					t/a	*		
1	RO			RO	0.1		-	
2					10		-	

								GB343 30-2017
3					0.1		-	
4					1.2		-	



1

		1#	HCl	4.3mg/m ³ 0.052t/a	0.217mg/m ³ 0.003t/a
			HF	0.01mg/m ³ 0.0001t/a	0.0005mg/m ³ 0.000005t/a
			HCl	- 0.0005t/a	- 0.0005t/a
			HF	- 0.00004t/a	- 0.00004t/a
		96m ³ /a	COD	350mg/L 0.034t/a	0
			SS	300mg/L 0.029t/a	0
			NH ₃ -N	25mg/L 0.002t/a	0
				3mg/L 0.0003t/a	0
		136m ³ /a	pH	1-2	0
			COD	100mg/L 0.014t/a	0
			SS	200mg/L 0.027t/a	0
		1200m ³ /a	pH	4-5	0
			COD	50mg/L 0.060t/a	0
			SS	1500mg/L 1.800t/a	0
		36m ³ /a	pH	9-11	0
			COD	100mg/L 0.004t/a	0
			SS	200mg/L 0.007t/a	0
		680m ³ /a	COD	50mg/L 0.034t/a	0
			SS	50mg/L 0.034t/a	0
		-	-	-	-
			RO	0.1t/a	
				10t/a	
				0.1t/a	
				1.2t/a	
		丰			
		75~85dB(A)			
		价			
		GB12348-2008 3			

1

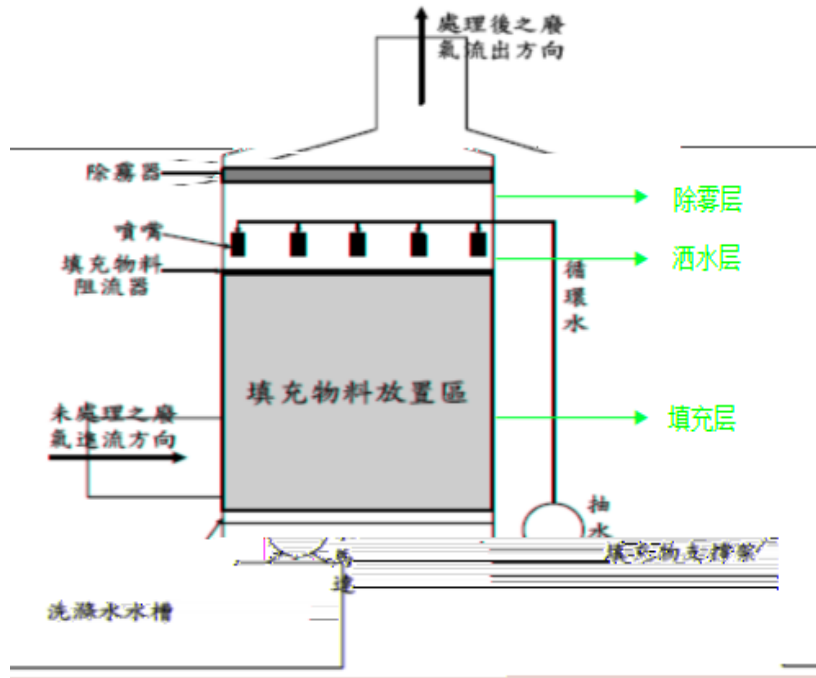
丰

1#

7-1

7-1

	100%	HCl HF	95%	丰 1#



7-1

HCl HF

丰

FRP

A AERSCREEN

Pmax D10%

(HJ2.2-2018)

Pi

$$Pi = Ci / C0i \times 100\%$$

Pi i %

Ci i 1h

b* 3

C0i i g/m³

7-1

	K +
	K 10%
	Pmax 1%

2

7-2 7-3

7-2

	m		m				m ³ /h		kg/h
	X	Y		m	m	m			
1#	674968.03	3801517.27	2	15	0.5	25	10000	HCl	0.002
								HF	0.000005

7-3

()

	m		m					kg/h
	X	Y		m	m	m		
	674960.87	3801537.27	2	8	4	4	HCl	0.00007
							HF	0.000006

3

7-4

7-4		
/	/	U
		65
	/	38
	/	-18
		<input type="checkbox"/> <input checked="" type="checkbox"/>
	/m	/
		<input type="checkbox"/> <input checked="" type="checkbox"/>
	/km	/
	/°	/

4

7-5

7-5

		mg/m ³	P _{max} %	D _{10%} (m)
1#	HCl	2.61E-03	5.21	/
	HF	6.06E-06	0.03	/
	HCl	5.03E-04	1.01	/
	HF	4.31E-05	0.22	/

Pmax 丰 1# HCl

丰 0.00261mg/m³ Pmax 丰 5.21% 1% 10% 57m

丰

5

7-9

			mg/m ³	kg/h	t/a
1	/	/	/	/	/
1	1#	HCl	0.217	0.002	0.003
2		HF	0.0005	0.000005	0.000005
		HCl		0.003	
		HF		0.000005	
			HCl		0.003

			HF	0.000005	
7-10					
				mg/m³	t/a
1		HCl	GB16297-1996	0.20	0.0005
2		HF	GB16297-1996	0.02	0.00004
			HCl	0.0005	
			HF	0.00004	
7-11					
					t/a
1		HCl			0.0035
2		HF			0.000045
6					
7					
7-12					
		80+	=5~50		=5km
	SO ₂ +NO _x	- +++ *	0++ - +++ *		<500t/a
		SO ₂ NO ₂ PM ₁₀ PM _{2.5} CO O ₃	HCl HF		KH - 0 PM2.5
				D	



2019

丰

丰

+

GB/T 19923-2005

GB/T

18920-2002

1

丰

HJ 2.3-2018

7-10

7-10

		Q/ m³/d
		W/
		L - + + + + R 1 + + + + +
A		Q 200 W 6000
B		

10

似 丰

B

10

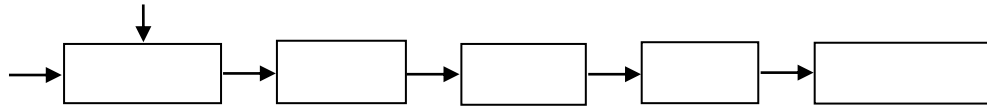
丰

B

2

丰

7-2



7-2

丰10m³/d

7-13

7-13

1			1	
2			1	1 1
3			2	
4	pH		1	
5			1	
6			1	
7			2	1 1
8			1	
9		PE	1	
10		SS304	2	
11			1	
12			1	

7-14

7-14

	pH	COD	SS
mg/m ³	1-11	100	1000
mg/m ³	6-9	100	1000
%	/	0	0
mg/m ³	6-9	90	500
%	/	10	50
mg/m ³	6-9	60	100
%	/	33	80
mg/m ³	6-9	50	20

3

丰

75 85dB A

价

1 3

- HJ2.4-2009

$$L_{p(r)} - L_{p(r_0)} = 20 \lg\left(\frac{r}{r_0}\right)$$

$L_{p(r)}$ r A dB A

$L_{p(r_0)}$ r₀ A dB A

r m

r₀ m

LW A LAW

$$L_{p(r)} - L_w = 20 \lg(r) - 8$$

$$L_{Tp} = 10 \lg \left(10^{0.1L_{p1}} + 10^{0.1L_{p2}} + \dots + 10^{0.1L_{pn}} \right)$$

7-15

7-15

dB(A)

	36	65	
	53	65	
	29	65	
	42	65	

价

GB12348-2008 3

4

RO

7-18

7-18

					(t/a)		
1	RO		HW49	900-041-49	0.1		
2			HW49	900-041-49	10		
3			HW49	900-041-49	0.1		
4			99	-	1.2		-

2# 依 10m²

GB18597-2001

丰 RO 0.1t/a 10t/a 0.1t/a

RO 1

250kg 3

1

1m²

丰 4m²

10m²

≦

RO

丰

似

似

住

RO

价

HW49

1

丰

JS1300OOI553

7-19

7-19

	RO	HW49	900-041-49	2# 依	10m ²		0.25t	1
		HW49	900-041-49				0.5t	
		HW49	900-041-49				0.1t	

丰

5

1

A

HJ169-2018

B

个

丰 36.5% 37%

丰

个 1
B

B
个 Q 1

RO

个 Q 1 丰 I
HJ169 2018 1
丰

7-17

		E118.907167		N34.338869
	10t		0.5t	



2

c.

d.

丰

a.

b.

c.

d.

e.

7

9

[97]122

() ([1996]463)

7-19

7-19

	FQ+				
	ZS+				
	GF-02				

1

2

3

10

1

丰

2

丰

丰

≦

丰 HF

HCl

丰 HF HCl

8-1

8-1

			pH COD SS	
		1#	HF HCl	
			HF HCl	
		1m		

11

7-17



			/
			-
			2
			5
			-
			26

	1#	HCl HF		
		HCl HF		
		COD SS		GB/T25499-2010
		pH COD SS	+	GB/T19923-2005

- - - -

1

2011 08 16

5539.91m²

500

2011 12 13

[2011]289

2012 06 15

[2012]17

丰

价

500

丰

500

2

2019 2 14

[2019]6

(2019)

(2012)

2012

[2015]118

2012

2012

2013

2013

3

[2018]90

丰

丰

丰

丰

4

2019

丰

HF

GB3095-2012

HCl

HJ2.2-2018

D

(GB3838-2002)

(GB3096-2008)

3

5

1

HCl HF

15m 1#

HCl HF

2

丰

GB/T

19923-2005

3

丰

RO

RO

4

价

GB12348-2008 3

6

丰 HCl 0.003t/a HF 0.000005t/a

丰

丰

1

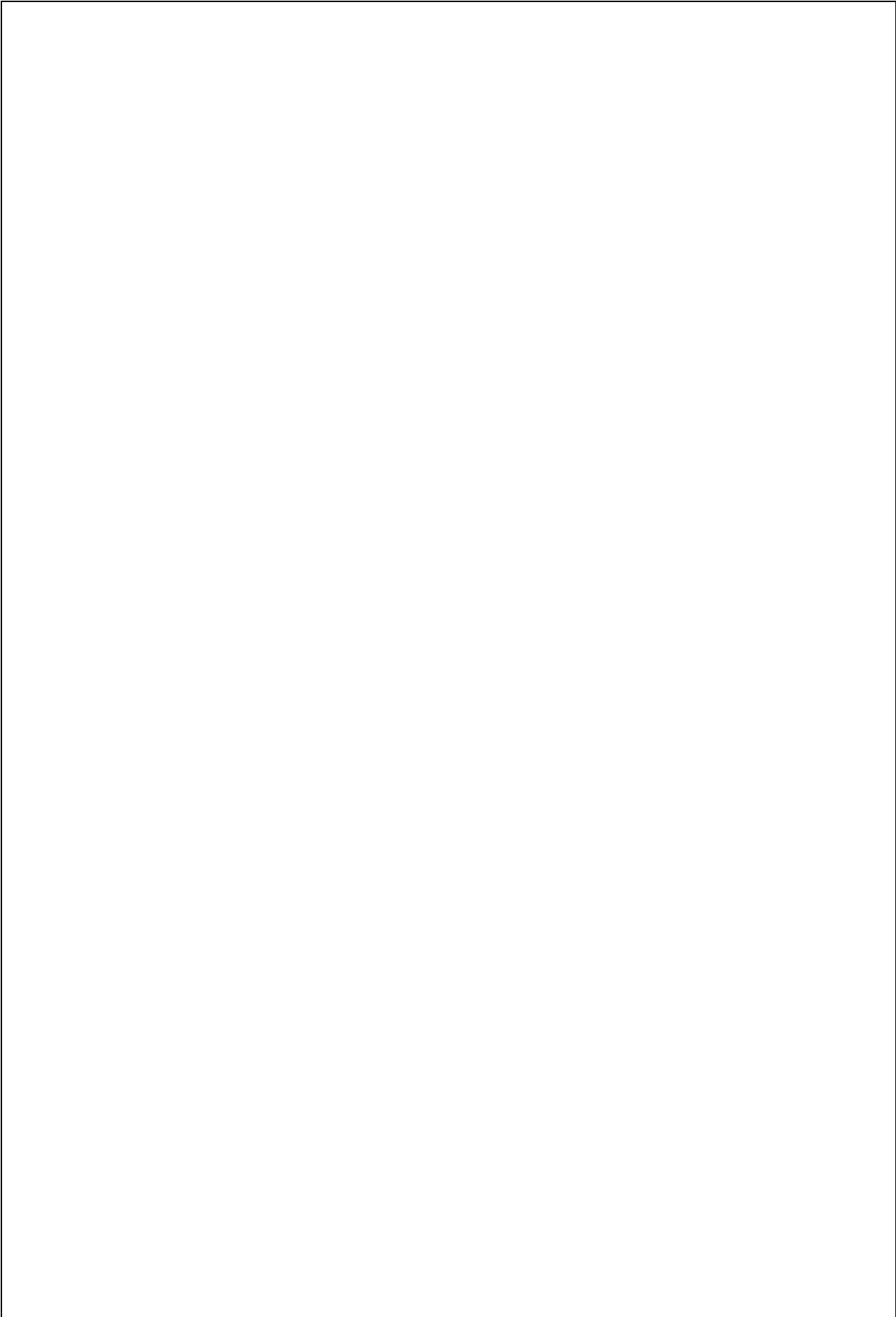
价

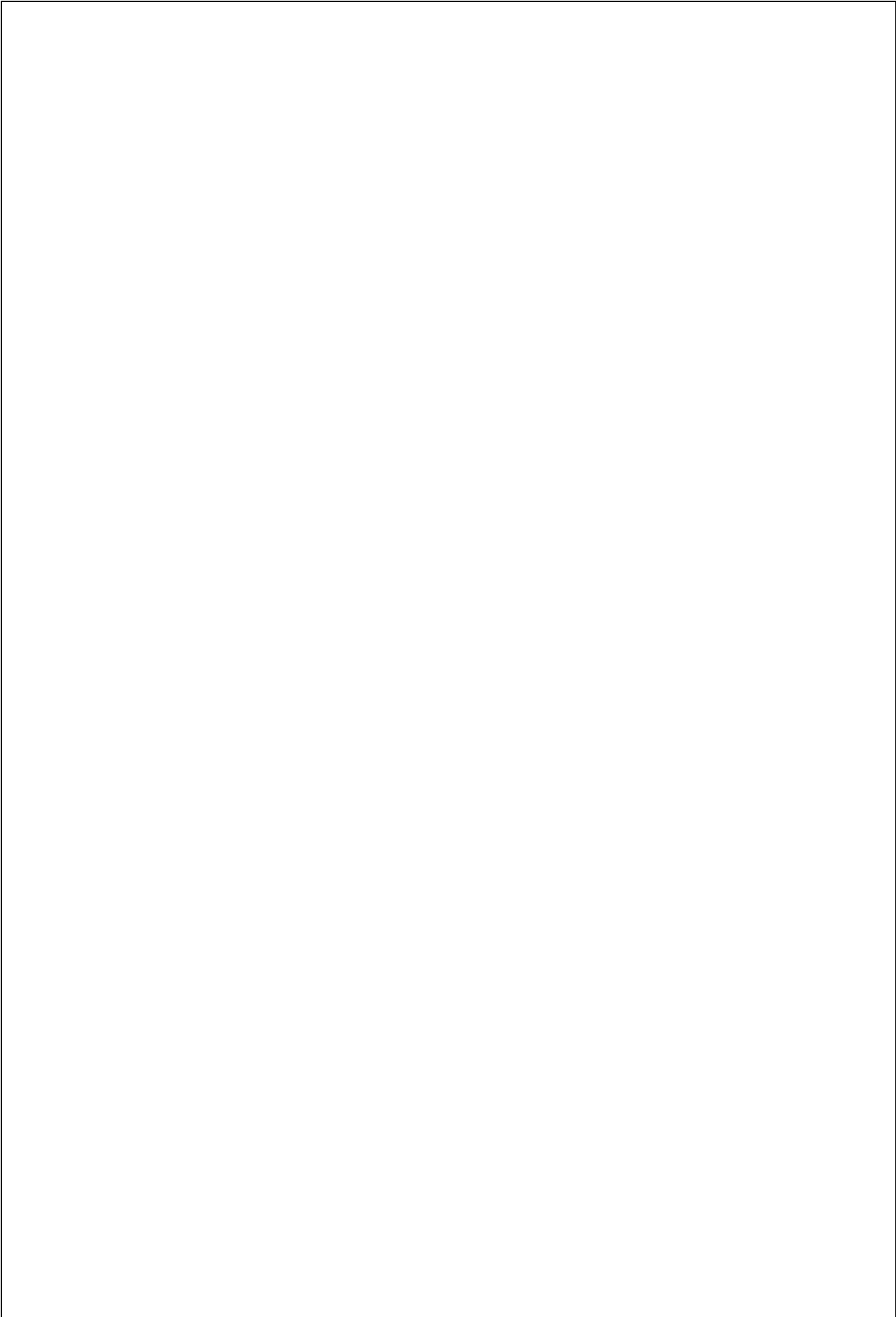
2

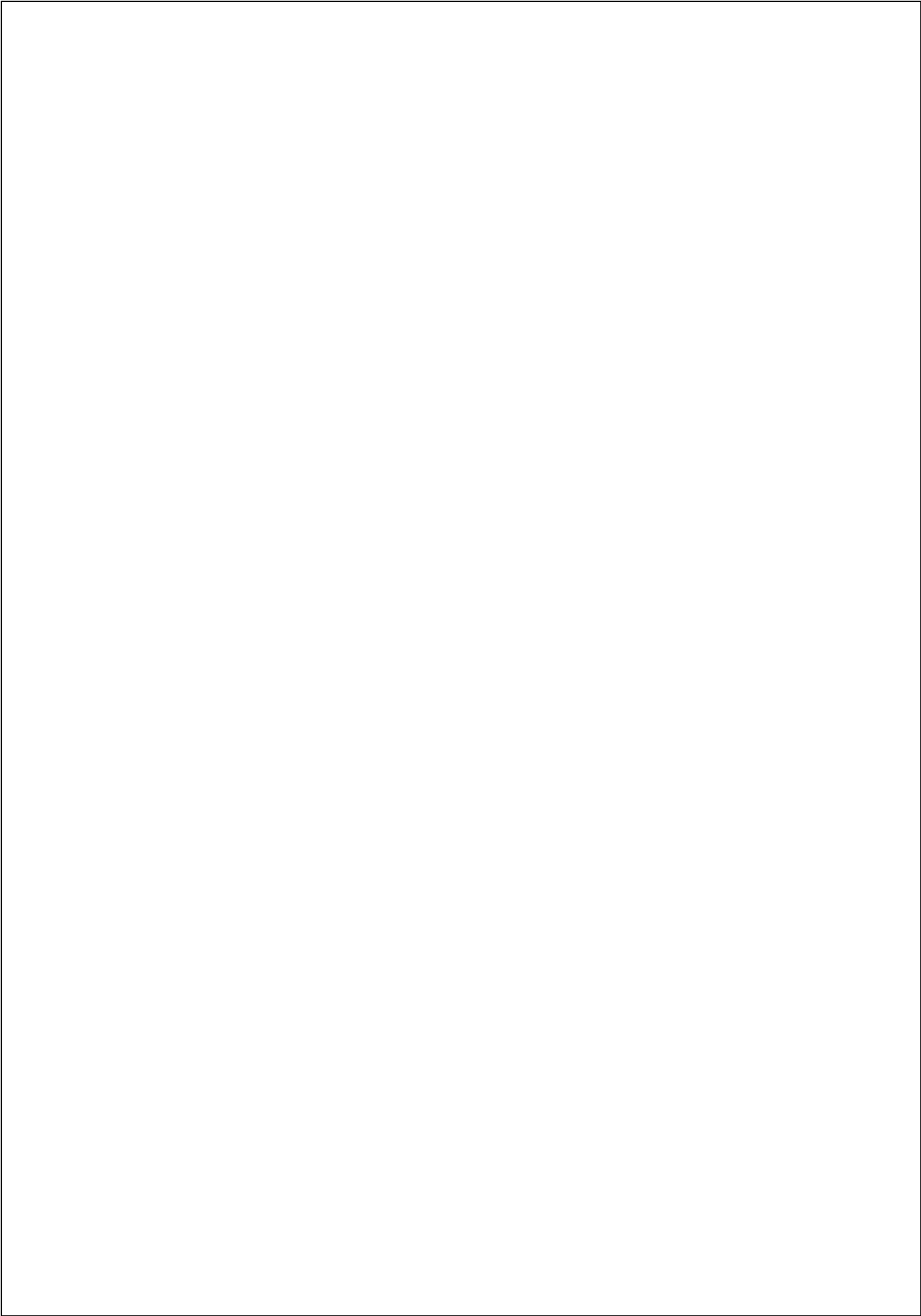
3

4

5







1

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1~2

1

2

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6

