
11 100
2006 6 1
12 [2010]398
13 2009 9
14 [2002]71
15 [2007]57 <
>
16 [2012]004
17 2012 98
18 21
< 2011 >
19
12 2011
20 [2012]130
21 2013
331
22 2013 330
23 2014 53
24 [2013]35
25 [2013]167
26 ··· [2013]103 <



>

27

1-3-1

1				
2				
3				
4				
5				
6				
7				
8				
9				

1.3.1

21

<

2011

>

12

2011

2013 331

2013

330

1.3.2

1.3.3

1.3.4

VOC_s

1.3.5

1.3.6

1.3.7

1.3.8

1.3.9

% (

% (" %

1

2

3

a.

b.

4

a.

b.

c.

d.

5

6

7

8

9

10

11

12

% (" &

%)
%) "%
1

HJ2.2-2008
 $P_i = \frac{C_i}{C_{oi}} \times 100$
 D_{10}

$$P_i = (C_i / C_{oi}) \times 100$$

P_i i
 C_i i mg/m^3
 C_{oi} i mg/m^3

1-5-1

	Code	Name	H m	D m	V m^3/s	T K	Hr h	Cond							
									kg/h	kg/h	kg/h	VOC _s kg/h	SO ₂ kg/h	NO _x kg/h	
	G ₁		15	0.3	0.83	293	4550				0.007				
	G ₂		15	0.65	2.8	293	2500		0.027	0.072		0.22	0.01	0.023	0.13

1-5-2

		C _i mg/m^3	C _{oi} mg/m^3	P _i	D ¹ m
	²	0.00018	0.45	0.04%	87
		0.004669	0.3	1.56%	97
		0.01245	0.6	2.08%	97
	³ VOC _s	0.03805	2.0	1.9%	97
		0.000459	0.45	0.102%	99
	SO ₂	0.001056	0.5	0.21%	99
	NO _x	0.005967	0.25	2.39%	99

¹ i
² PM₁₀
³ VOC_s
 DB12/ 524-2014
 VOCs 2.0 mg/m^3

10%

%) "&

27.2m³/d

HJ/T2.3-93

%) "'

3

HJ2.4-2009

—

% *'

% *" %

2.5km

2

% *" &

% *"'

1m

% +'

% +" %

1-7-1

1-7-1

1			800m	
2			1400m	
3			1000m	

% +" &

% +" &" %

1

2		6
3		
% " & "		
1		
	GB16297 1996	
GB9078-1996		DB12/
524-2014		
	GB3095-2012	TJ36-79
2		
	DB12/356-2008	
3		
	GB12348-2008	
3		
4		
5		
% ,		
% , "%		
	PM ₁₀ SO ₂ NO ₂	
		SO ₂ NO ₂ VOC _s
	PM ₁₀	VOC _s
% , "&		
	pH COD _{Cr} BOD ₅ SS	
% , "'		
A		

1-9-2		dB(A)
3	65	55

% - " &

1 GB16297 1996

1-9-3

1-9-3			
	mg/m ³	m	kg/h
	120	15	3.5
*	240	15	
*	550	15	

GB16297-1996

2

DB12/ 524-2014

1-9-4

1-9-4					
			mg/m ³	m	kg/h
			20	15	0.6
		VOC _s	50		1.5

15m

3 GB9078-1996

1-9-5

1-9-5	
	mg/m ³
	200

4 DB12/356-2008

1-9-6

1-9-6		mg/l pH				
	pH	BOD ₅	COD _{Cr}	SS		
	6 9	300	500	400	35	3

5 GB12348-2008

3

1-9-7

1-9-7		[dB(A)]
3	65	55

6 GB12523-2011

1-9-8

1-9-8	[dB(A)]
70	55

7 HJ2025 2012

8 GB18597 2001

9 GB18599 2001

&" ·

&" %

120

H

30

30000

SUV

MPV

2009

2013

2009

13

2-1-1

2-2-1

	t/a									
		SO ₂	NO _x		VOC _s *	COD		Zn	Ni	
	24.5 1.81	31.5 4.49	30.8 14.4	59.8	217.8	52.7 14.7	3.2 1.54			2.1 0.027
		10.42	30.48			43.64	2.65	0.148	0.063	
KD						0.7	0.18			
KD						0.34	0.08			
						0.19	0.05			
						0.42	0.36			
						1.23	0.09			
	0.26	0.035	1.58			0.67	0.05			
EG 30	0.86	2.16				9.88	0.34			0.3
EG/EB *	15 0.43	1.08	0.98		2.1	-2.36	-0.02			-0.08
	20 0.03	0.05				2.96	0.02			0.28
						147.9	10.6			
						90.3	6.5			
	26.08	45.245	63.84	59.8	217.8	348.57	24.1	0.148	0.063	2.6

DB12/ 524-2014

VOC_s

&"'

''

''%

''%%

''%&

1 2

''%'

2014 12 2015 9

''%(

9230.39

''%)

H6 C50 CH071 35 20

''%*

300 2 8 283

3-1-1

3-1-1

			h	
1			2190h	4550h
2			2190h	2500h
3			2190h	2500 h

''%+

7m

12m

12m×12m

3-1-4

1		t/a	109.13	
2		t/a	175.53	

3-1-7

' "&''

1 10kV 1000kVA
10kV YJV22-8.7/15

' "&" (

' "&")

1

800m³/h 1000m³/h 0.6MPa
2 Ar+O₂
Ar+O₂ Ar:O₂=97:3 Ar+O₂
Ar:O₂=97:3 17.71m³/h Ar 17.18 m³/h O₂ 0.53
m³/h 7.5 5m³ Ar 15
Ar Ar O₂ O₂
5 2

3

4

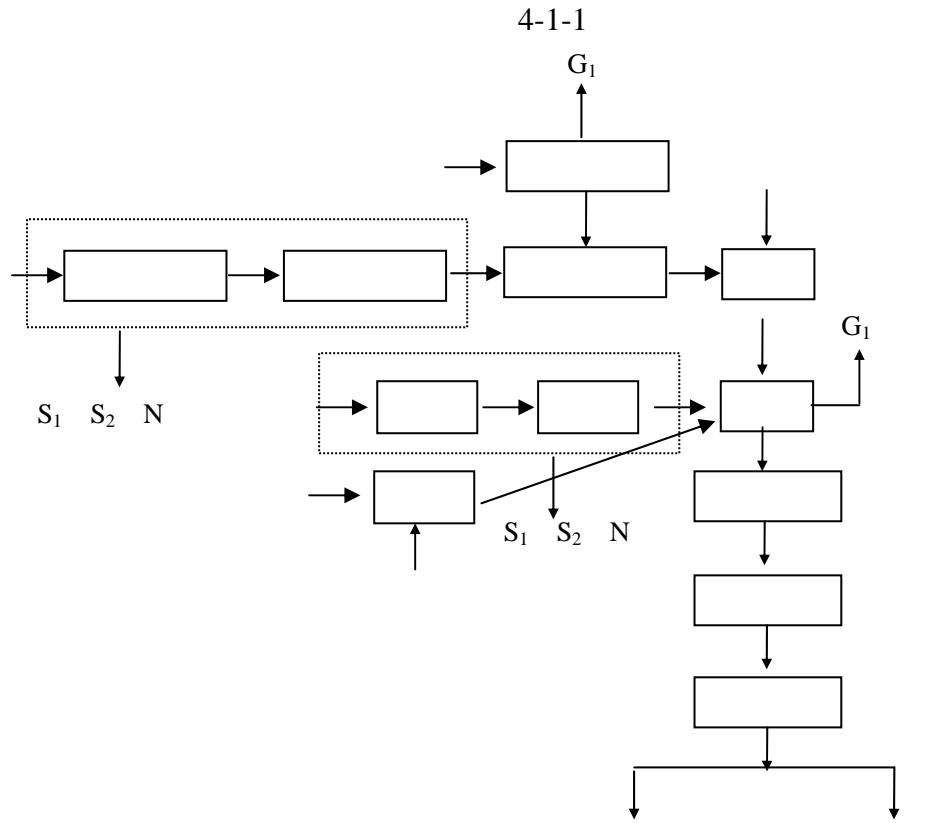
5

3-1-8

11 ·

12 ·

13 ·



4-1-1

S₁

S₂

N

G₁

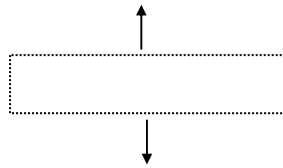
("%&"

ž

%

&aa

4-1-2

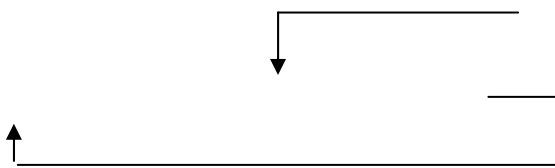


G₂

S₃

("&

100.0m³/h



Q=100 m³/h H=45M

N=30KW

("'

0.5~0.7mg/m³

0.36kg/h

98%

0.007kg/h

(" (" % &

; &

VOC_s

4-4-1

4-4-1

t/a	%				kg/h		
			VOC _s				VOC _s
20	6.6	18	55	2500	0.53	1.44	4.4

4-4-2

VOC

	kg/h	
		VOC _s
	1.97	4.4
	95%	
	0.099	0.22

15 m³

4000

100

y 10⁴m³

286.2kg SO₂630kg NO_x3400.46kg

0.01kg/h SO₂0.024kg/h NO_x0.13kg/h

(" (" &

4-4-3

m³/d

	16	1600	16	0	
	0.4	-	-	0.4	
	34		6.8	27.2	
	6.4		6.4	0	
	56.8	1600	29.2	26.8	

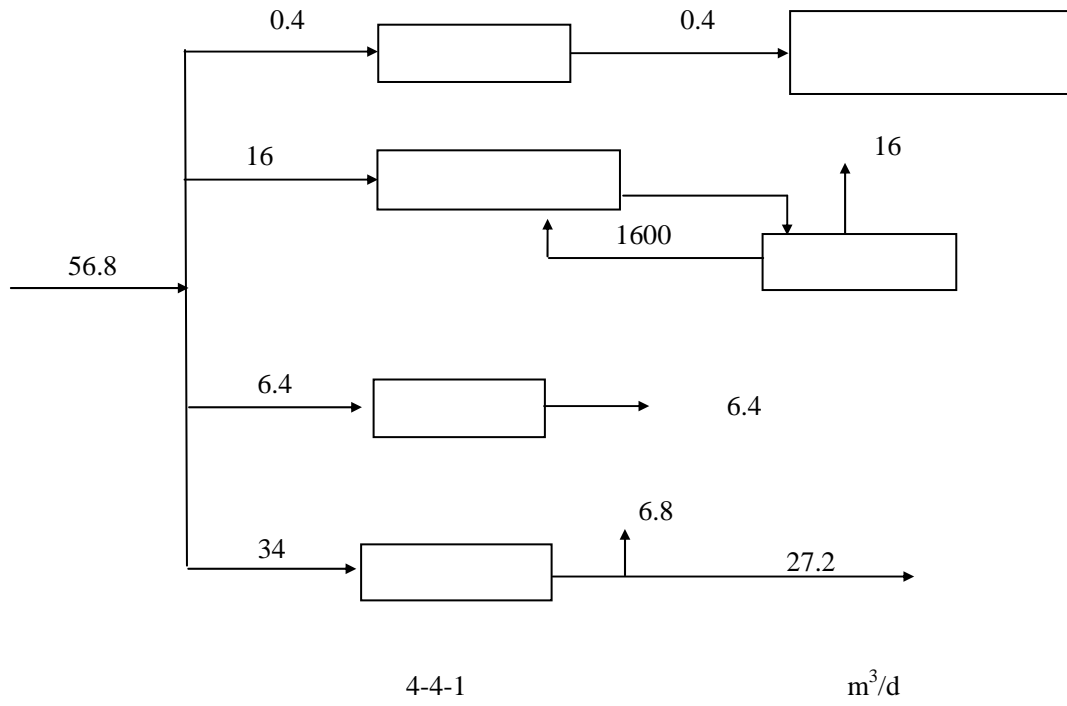
4-4-3

56.8m³/d

1600m³/d

96.6

4-4-1



(" (" " .

70~85dB(A)

(" (" (.

(") .

(") "% .

(") "% "% .

98%

15m

(") "% & .

1

95%

15m

(")"&

(")"''

(")"'' "%

(")"'' "&

(")"('

(" *

(" * "%

4-6-1

		m ³ /h				kg/h	mg ³ /m	
				m				
	G ₁	3000	98%	15		0.007	2.3	
	G ₂	10000	+	15		0.099	9.9	
			95%		VOC _s	0.22	22	
						0.01	1	
					SO ₂	0.023	2.3	
						NO _x	0.13	13

(" * "&

4-6-2

4-6-3

		75~80	
		80	
		85	
		70 85	

)" *"

4-6-4

4-6-4

			t/a
			0.4
			6
			120
			2
			1000 /
			42.5

)"

)" %

TEDA

48km²

28km TEDA 18km 15km
 12km 12km 8km 4km 3km
 39°04'55.54"

117°30'01.24"

)" &

)" &" %

2m

1m

1/6000 1/10000

)"

TEDA

15

2003

2010

6

42

"

"

30

110

180

30

34

290

38

4800

660

4

160

70

30

80

2010

207

48.2%

55

13.9

" "

)"
)"("%

9 DL382 PM₁₀ SO₂
 NO₂ PM_{2.5} 2014 7 29 8 4
 2.4km 5-4-1
 5-4-1

				mg/m ³	%	mg/m ³	(%)	(%)	
DL382	9	PM ₁₀	7	0.112~0.141	100	0.15	94	0	
		PM _{2.5}	7	0.052~0.064	100	0.075	85.3	0	
	SO ₂	28	0.007~0.030	100	0.5	60	0		
		7	0.012~0.019	100	0.15	12.6	0		
	NO ₂	28	0.023~0.062	100	0.2	31	0		
		7	0.038~0.045	100	0.08	56.2	0		

PM₁₀ PM_{2.5} SO₂ NO₂ SO₂
 NO₂ GB3095-2012

)"("&
 1

5-4-2

1				PM ₁₀
2			800m	
3			1400m	

2
 2013 12 1 3 3

4

5-4-3

5-4-4

5-4-3		(mg/m ³)			
		PM ₁₀			
			0.023		0.3 0.7
			0.0026	0.00075	0.43
		0.05 0.051			
			0.013		0.3 0.7
			0.0018	0.00075	0.46
		0.063 0.064			
			0.022		0.3 0.6
			0.0037	0.00075	0.44
		0.05 0.051			

5-4-4

			kPa	%	m/s	
2013.12.1	02:00~03:00	-5.3	102.6	27.4	1.5	
	08:00~09:00	-3.1	102.8	31.1	1.4	
	14:00~15:00	3.5	102.5	25.8	1.1	
	20:00~21:00	-1.0	102.5	33.7	1.2	
2013.12.2	02:00~03:00	-2.4	102.6	38.9	1.4	
	08:00~09:00	-4.7	102.8	43.7	1.3	
	14:00~15:00	4.6	102.8	27.4	1.2	
	20:00~21:00	0.1	103.1	29.3	1.2	
2013.12.3	02:00~03:00	-2.4	102.7	30.3	1.3	
	08:00~09:00	-4.9	102.8	42.9	1.6	
	14:00~15:00	4.8	102.8	31.7	1.5	
	20:00~21:00	0.5	103.3	35.2	1.6	

6

5-4-3

2.0mg/m³ PM₁₀

GB3095 2012

)")

2013 12 1-2

2

5-5-1

5-5-1			dB A			
	63.8	41.3	3	65	55	
	60.3	42				
	62	43.9				
	63.1	44.3				

GB3096-2008

3

)"*

1.25 / 5

/ 15 /

GB18918-2002

B

5 / 8600t/d

5-6-1



TSP
GB3095-2012

50m

TSP
TSP

100~150m TSP

150m

3.4m/s

150m

150m

*" %&

2002 52

[2002]54

[2006] 100

[2013]35

2014 53

1

2

3

4

5

6

7

8

9

10

11

12 4

13

14

15

*" &

$$L_p = L_w - 20 \lg(r/r_0) - R - \frac{1}{4}(r - r_0)$$

L_p			dB(A)
L_w			dB(A)
r		m	
r_0		1m	
R		5dB(A)	
$\frac{1}{4}$		dB(A)/m	0.008dB(A)/m
	6-2-2		

*"("&

1

2

3

4

5

6

*")'

+"

+" %

+" % %

7-1-1

GB9078-1996

GB16297-1996

GB16297-1996

VOC_s

DB12/ 524-2014

GB16297-1996

200m

5m

+ " % & ' .

1

VOC_s

HJ2.2-2008

-

SO₂ NO_x VOC_s

7-1-4

7-1-4

		Ci mg/m ³	Coi mg/m ³	Pi	D ¹ m
	2	0.00018	0.45	0.04%	87
		0.004669	0.3	1.56%	97
		0.01245	0.6	2.08%	97
	³ VOC _s	0.03805	2.0	1.9%	97
		0.000459	0.45	0.102%	99
	SO ₂	0.001056	0.5	0.21%	99
	NO _x	0.005967	0.25	2.39%	99

¹ i
³ VOC_s

2

PM₁₀

3

DB12/ 524-2014

VOC_s 2.0 mg/m³

HJ2.2-2008

-

87m

0.04%

GB3095-2012

()

99m

0.102%

GB3095-2012

() SO₂

99m

0.21%

GB3095-2012

() NO_x

99m

2.39% GB3095-2012 ()
 97m 1.56% TJ36-79

97m 2.08% CH245-71
 VOC_s 97m

1.9% DB12/ 524-2014

VOC_s 2.0 mg/m³

2

7-1-5		mg/m ³	
PM ₁₀		0.00013	0.0002
		0.19	0.15
		0.19013	0.1502
		0.45	
SO ₂		0.0002081	0.0004402
		-	-
		0.0002081	0.0004402
		0.5	
NO _x		0.001176	0.002488
		-	-
		0.001176	0.002488
		0.25	
		0.0013	0.00061
		0.0018	0.0037
		0.0031	0.0043
		0.6	
		0.00047	0.00022
		0.00075	0.00075
		0.0012	0.00097
		0.3	
VOC _s		0.0018	0.00084
		-	-
		0.0018	0.00084
		2.0	

PM₁₀

TJ36-79

GB3095-2012

5 /

8600t/d

0.3%

+''

+''''%

7-3-1

7-3-1

		75~80	
		80	
		85	
		70 85	

WpUR

7-3-2					[dB(A)]	
		(m)				
		20	41	44	65	55
		30	44.5	40.5	65	55

GB12348-2008

3

+" (

+" (" %

7-4-1

7-4-1			
			t/a
			0.4
			6
			120
			2
			1000 /
			42.5

+" (" &

2008

7-4-2

7-4-2



, "%

2007 41

8-1-1

	20		t/	8	0.56	
			t /	8	0.42	
			t/	4	18.48	
	30	SO ₂	kg/	4	1.48	
			kg/	6	0.99	
			t/	8	14.45	
			kg/	3	0.03	
			COD	kg/	3	1.77
				t/	6	0.12
	30		%	12	/	
				%	12	/
				%	6	/
	20		%	10	80%	
				%	10	85%

, "&

, "&" %

1

9230.39

6000

284.66

0.05

0.56

2

8-2-1

8-2-1

					tce	
1		kW.h	9898.01	1.229	12164.65	
2		m ³	15	12.143	182.145	

3

K_i — i

20

, "&" &

1

8160

1.36

2

COD

COD

2856kg

COD

0.0005

3

6

0.001

4

1.2

30

, "&" ' .

1

JB14-2004

1.6t

15053.715t

5250t

0.35t

12

2

3

6

4

A_i

$$P_1 = A_i \cdot \sum_{i=1}^{m_i} S_i \cdot K_i$$

A_i —

$$A_i = A_{i1} / A_{i2}$$

A_{i1} —

A_{i2} —

m_i —

	30	96.7%
1		
2	10	
6		100%
10		
20		

1

2

2

3

4

5

, "(

(P)

$$P = \alpha \cdot P_1 + \beta \cdot P_2$$

P—

—

0.4

P₁—

—

0.6

P₂—

8-4-1

8-4-1

	P 92
	85 P 92

ISO14001

,")

50

, " * .



-"
 -"%
 2011 21 <
 >
 12
 2011
 2013 331
 2013
 330
 -"&
 2005-2020
 2005-2020
 2007 11 16
 [2009]9
 < >
 184 km² 124km²

%¹¹ %

300

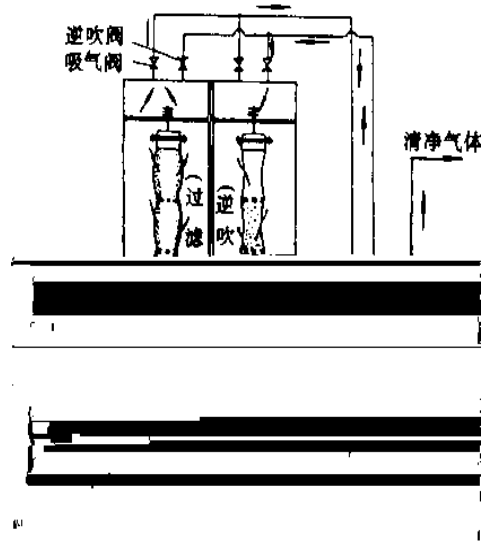
10-1-1

10-1-1

		t/a		0.03	0.03		
		t/a		0.18	0.18		
		t/a	58.8	0.07	58.87	59.8	
	VOC _s *	t/a	216.8	0.55	217.35	217.8	
		t/a	3.39	0.04	3.43	26.08	
	SO ₂	t/a	15.235	0.095	15.33	45.245	
	NO _x	t/a	63.52	0.51	64.03	63.84	
	COD _{cr}	t/a	310.57	2.9 0.5 *	311.07	348.57	
		t/a	22.44	0.25 0.13 *	22.57	24.1	
		t/a	0.148				

PLC

98%



11-1-1

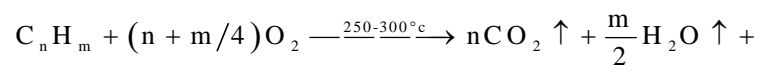
11.1.2

1

95%

15m

CO₂ H₂O



250-300

650-800

%%%' ' .

[2002]71

[2007]57

<

>

1

2

GB/T16157 1996

3

%&

%&" %

DB12/356-2008

%&" &

[2002]71

[2007]57

<

>

1

2

3

4

5

6

7

GB15562.1-1995

%&"

2012 GB18599 2001 GB18597 2001 HJ2025

10⁻⁷cm/s 1y

2mm 1y 10⁻¹⁰cm/s GB1556.2-1995

- 3
- 4
- 5
- 6

%&" (" &

%&"

%&" %

1

2

3

12-2-1

						30	30 50	50	
1		a.		b.		c.		d.	
2		a.		b.		c.		d.	
3		a.		b.		c.		d.	
4		a.		b.		c.		d.	
5		a.		b.		c.		d.	
6		a.		b.		c.		d.	
		“		”					
7		a.		b.		c.		d.	
		“		”					

1

√

2

%&'' .

50

100%

3

% "

% " %

% " &

9230.39

500

5.4%

13-2-1

13-2-1

		50
		10
		30
	1	10
	1	150
		20
		10
		20
		50
		50
		100
		500

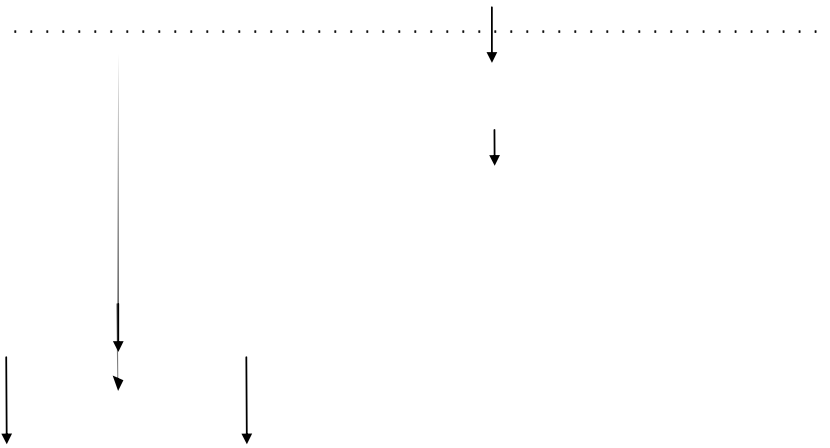
500

5.4%

% "

% " %

14-1-1



14-1-1

% " &

% " & %

1

2

3

4

5

6

7

8

9

% " & &

1

2

3

4

5

6

7

8

%" " " "

2

1

%" " (

ISO14000

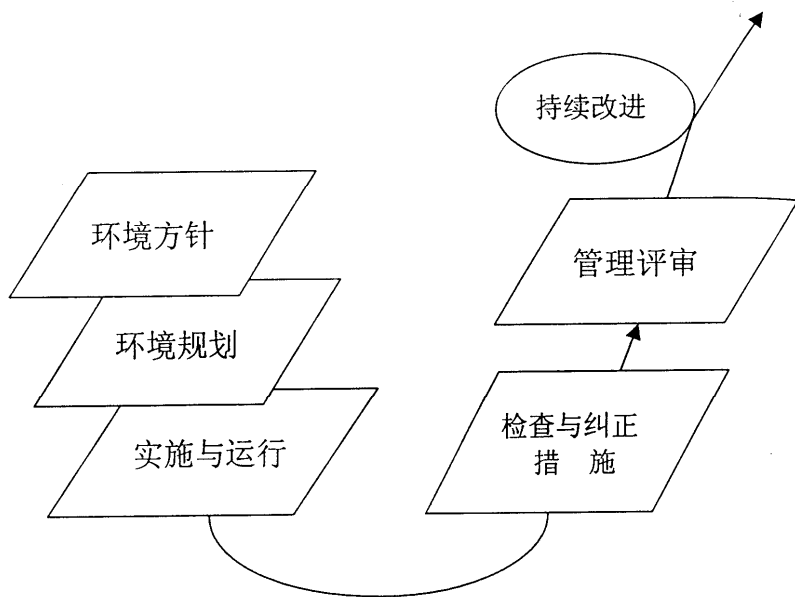
ISO14001

ISO14001

ISO14001

ISO14000

14-4-1



14-4-1

1	GB16297 1996	DB12/524-2014
2	DB12/356-2008	GB9078-1996
3	GB12348-2008	3
4	HJ2025 2012	
5	GB18599 2001	GB18597 2001

%(")

%(")*

14-6-1

14-6-1










			VOC _s SO ₂ NO _x	
			pH COD BOD SS	
		1m	A	

% " * " &

% " +

GB15562.1-1995 GB15562.2-1995

14-7-1

14-7-2

14-7-2

%"

%"%

2009

2013

9230.39

H6 C50 CH071

35

%"&

%"&"%

PM₁₀ PM_{2.5} SO₂ NO₂

SO₂

NO₂

GB3095-2012

2.0mg/m³

PM₁₀

GB3095 2012

%"&"&

GB3096-2008

3

%"

%" "%

%" "% %

15m

150t/a

1					GB9078-1996
					GB16297-1996
					GB16297-1996
				VOC _s	
DB12/ 524-2014					GB16297-1996
				200m	5m
2	HJ2.2-2008			-	
				87m	0.04%
	GB3095-2012			()	
	99m	0.102%		GB3095-2012	(
	) SO ₂			99m	0.21%
	GB3095-2012			() NO _x	99m
		2.39%		GB3095-2012	()
				97m	1.56%
					TJ36-79
		97m		2.08%	
	CH245-71				VOC _s
		97m		1.9%	DB12/ 524-2014
					VOC _s
2.0 mg/m ³					
3				PM ₁₀	
	TJ36-79				GB3095-2012

	PM ₁₀	PM ₁₀	3	0.45mg/m
		CH245-71		
SO ₂ NO _x				GB3095-2012
	VOC			

59.8t/a VOC_s 217.8t/a 26.08t/a SO₂ 45.245t/a NO_x
63.84t/a COD_{cr} 348.57t/a 2.6t/a 0.148t/a 0.063t/a
24.1t/a 0

“ ”
“ ” “ %
“ ” “ % %

“ ”

0.6-0.7Mpa

PLC

98%
“ ” “ % &

1

95%

15m

“ ” “ &
7.2

DB12/356-2008

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100%

0

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9230.39

500

5.4%

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[2002]71

[2007]57

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1

2

3

4

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6

7

GB15562.1-1995

	1
1.	1
1.1	1
1.2	4
1.3	4
1.4	6
1.5	7
1.6	8
1.7	8
1.8	9
1.9	10
2	12
2.1	12
2.2	13
2.3	14
3	15
3.1	.....	15
3.2	.....	18
4.	.....	20
4.1	.....	20
4.2	.....	22
4.3	.....	22
4.4	.....	23
4.5	.....	25
4.6	.....	26
5.	.....	27
5.1	.....	27
5.2	.....	27
5.3	.....	29
5.4	.....	30
5.5	.....	32
5.6	.....	32
6	.....	33
6.1	.....	33
6.2	.....	35
6.3	.....	37
6.4	.....	37
6.5	.....	38

7.	.....	39
7.1	.....	39
7.2	.....	42
7.3	.....	43
7.4	.....	44
8	.....	45
8.1	.....	46
8.2	.....	47
8.3	.....	50
8.4	.....	51
8.5	.....	52
8.6	.....	52
9.	.....	53
9.1	.....	53
9.2	.....	53
9.3	.....	54
10	.....	54
10.1	.....	55
10.2	.....	55
11.	.....	55
11.1	.....	55
11.2	.....	57
11.3	.....	57
11.4	.....	58
12	.....	59
12.1	.....	59
12.2	.....	60
12.3	.....	61
12.4	.....	62
13	.....	63
13.1	.....	63
13.2	.....	63
14.	.....	64
14.1	.....	64
14.2	.....	65
14.3	.....	66
14.4	.....	66
14.5	.....	67

14.6	.....	67
14.7	.....	68
14.8	.....	70
15.	.....	71
15.1	.....	71
15.2	.....	71
15.3	.....	71
15.4	72
15.5	73
15.6	74
15.7	74
15.8	75
15.9	76
15.10	76
15.11	76
15.11	76
15.12	77

- 1 1
- 2 2
- 3 3
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