
3.5	.....	55
6.1	.....	59
6.2	.....	60
7.1	.....	63
7.2	.....	72
7.3	.....	74
8.1	.....	83
8.2	.....	86
8.3	.....	127

附录 B 选用的安全评价方法简

B.1	.....	131
B.2	.....	131
B.3	.....	131

附录 C. 定性、定量分析危险、有害程度的过程

C.1	.....	134
C.2	.....	138
C.3	.....	153
C.4	.....	158
C.5		167
C.6		175
C.7		180
C.8		182
D.1		192
D.2		193
D.3		196
D.4		199
1		200
2		201
3		203
4		205
5		208

1.1

“

” “

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70

1.2

“ ”

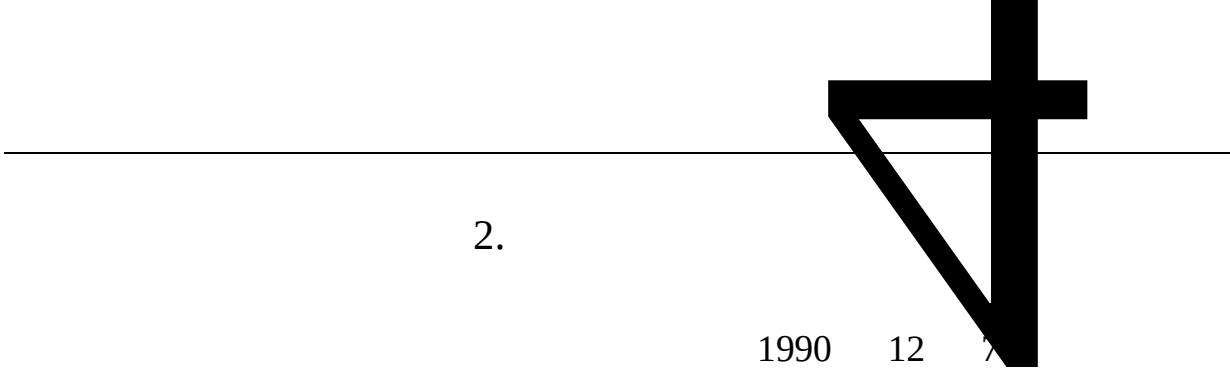
“ ”

1.3

1.3-1

1.3-1

29	T20	T2001	T2002	T2004	T2005	T2006	5				
	T23	T2301~T2308			8						
	T33	T3301~3304			4						
	T34	T3403	T3404	T3405	T3406	4					
	T35	T3501~3503		T3505~3508		7					
	/		T3512		1						
			3								
	VRU-2001	1400Nm³/h			P-2407A/B						
	VRU-2002	2400Nm³/h			VRU-2003		1500Nm³/h				



500

18

HSE

6

HSE

5

24

22

6

2025

2

6

2.0-1

2.0-1

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2.0-2

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/

1 T20 1997 1998

2.1.2

VOCs

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“ + ”

2.1.3

2024

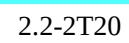
2023]

2018

2018

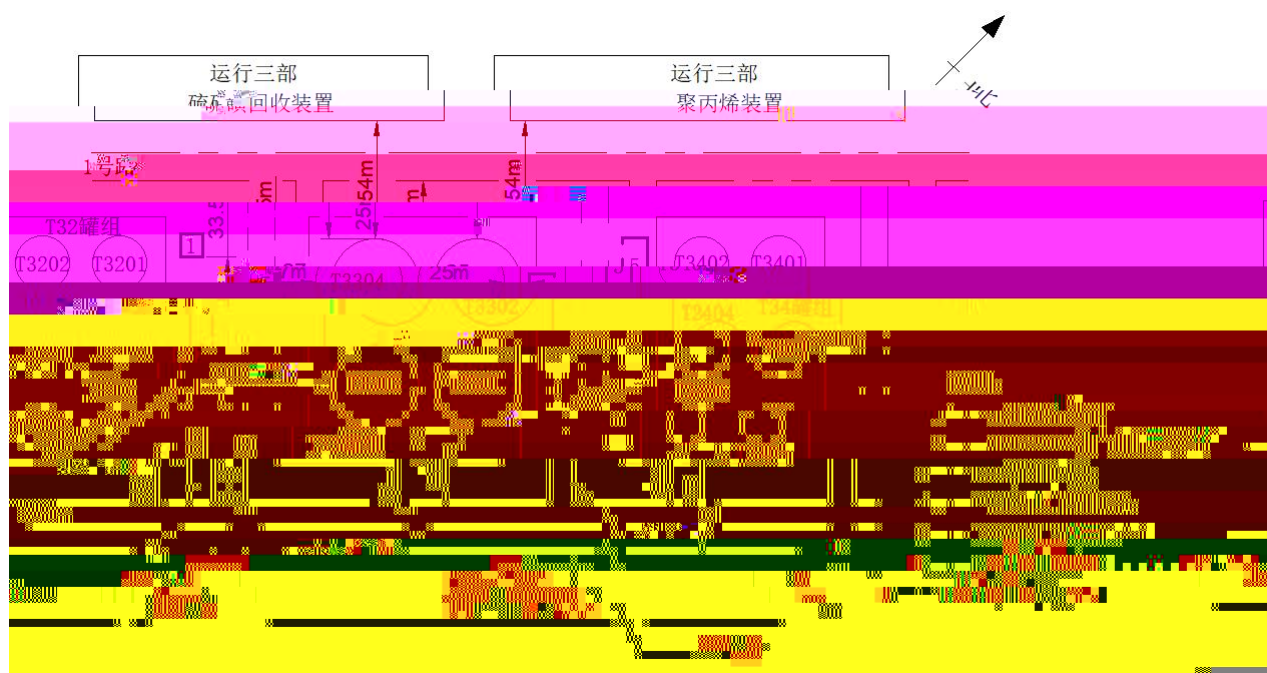
2015

<





T35
 T32
 3
 T30
 T33
 T34
 VRU-2002
 2.2-4
 2.2-3



	2.2-4	T33	T34	VRU-2002				
	2.2-3	T33	T34	VRU-2002				
					33.5	—		—
	10				1	—		—
		T3303						
		10000m ³	B	38.32	15× 1-25% =11.25	4.0.12	2M	≤
VRU-2002								

				4.0.12	5
	1	25	15× 1-25% =11.25		
T3304		54	35× 1-25% =26.25	4.2.12	5
10000m³ È					
B	10	27	—	—	
T3302					

T3502 20000m ³ B			21	25× 1-25% =18.75	4.2.12 5
T3506 20000m ³ B			42	30× 1-25% =22.5	
			52	35× 1-25% =26.25	4.1.9 4
			32	30× 1-25% =22.5	4.2.12 5
T3508 5000m ³ B			24	25× 1-25% =18.75	
			32	40× 1-25% =30	
T3507 5000m ³ B		35	16	—	—
T3501 5000m ³ B			23	30× 1-25% =22.5	4.2.12 5

2.2.2

2.3

3 T20 T23 T33
T34 T35 /

2.2-5

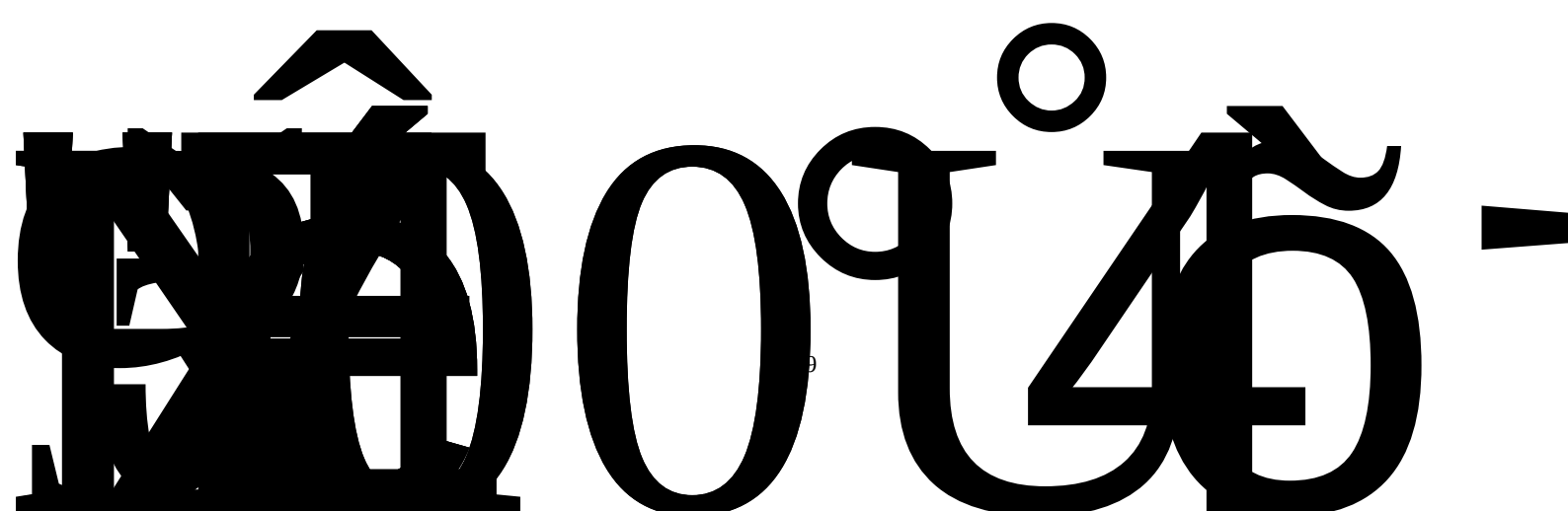
2.2-5

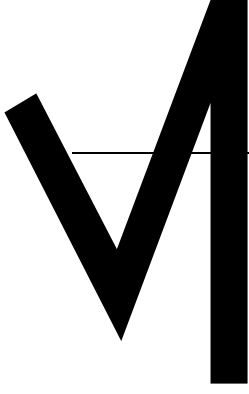
1	VRU-2001	1400	T20 T23
2	VRU-2002	2400	T33 T34
3	VRU-2003	1500	T35 /

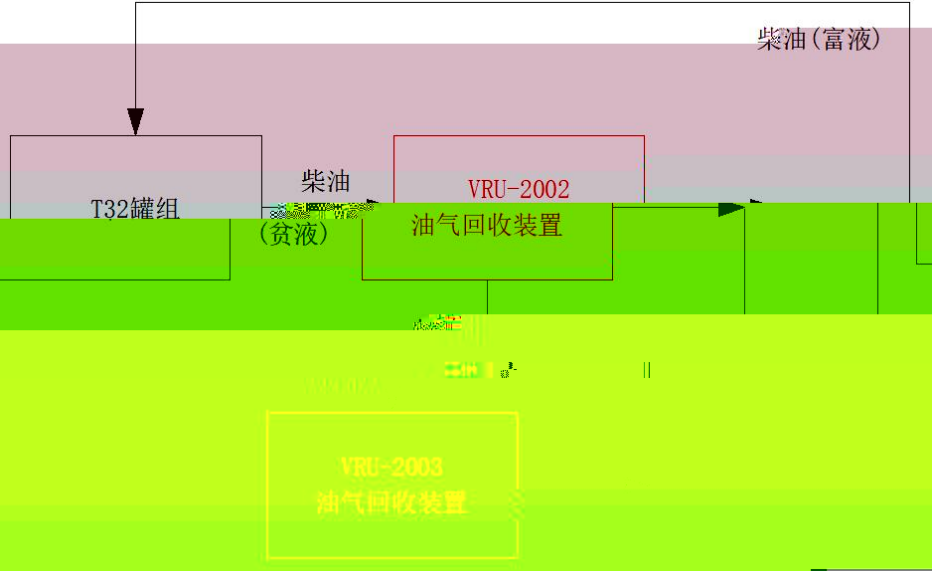
2.2-6

2.2-6

1		T2001	1×10 ⁴	Φ28000×19917
2		T2002	1×10 ⁴	Φ28000×19917
3	T20	T2004	1×10 ⁴	Φ28000×16850
4		T2005	1×10 ⁴	Φ28000×16850
5		T2006	1×10 ⁴	Φ28000×16850
6				







2.4-4T32

VRU-2001

T20 T23 VRU-2001
 T24

5~10 2
1 1

2 1
1

50%

VRU-2001

97%

VRU-2002

T33

T34

VRU-2002

T32

T32

VRU-2003

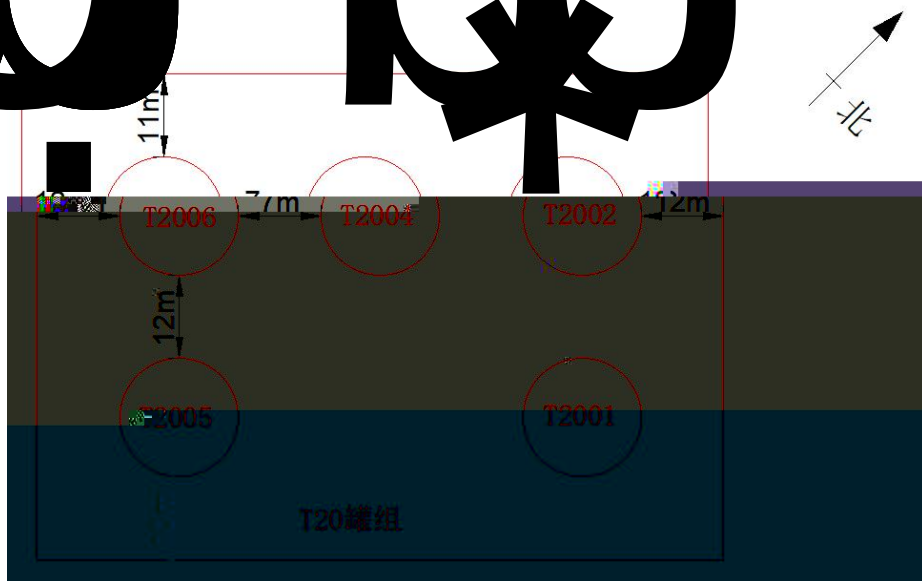
5~10

2

1

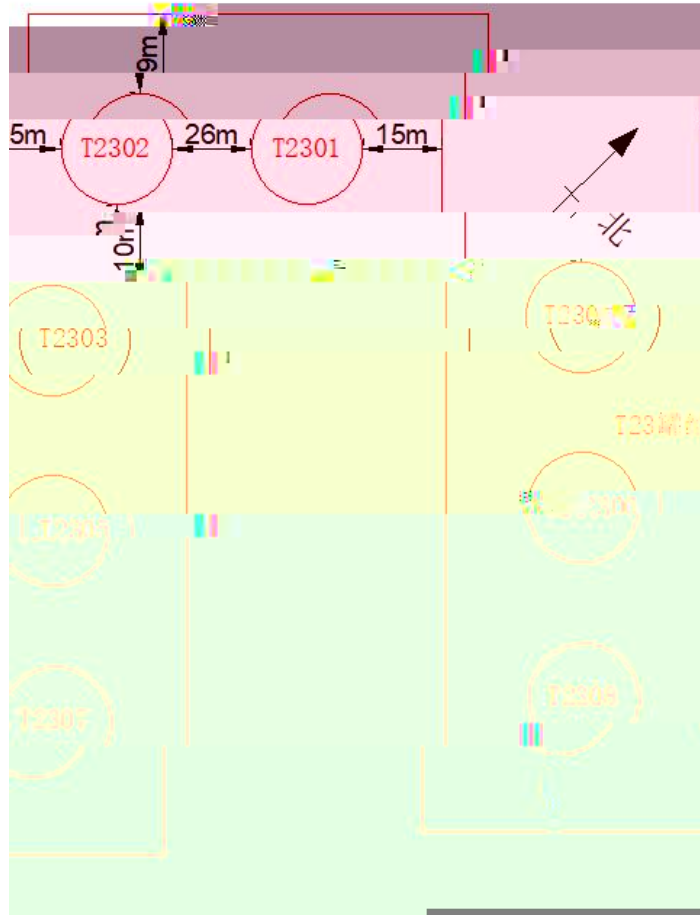
3 m "

VRU-2003



2.4-8T20

2.4-1T20



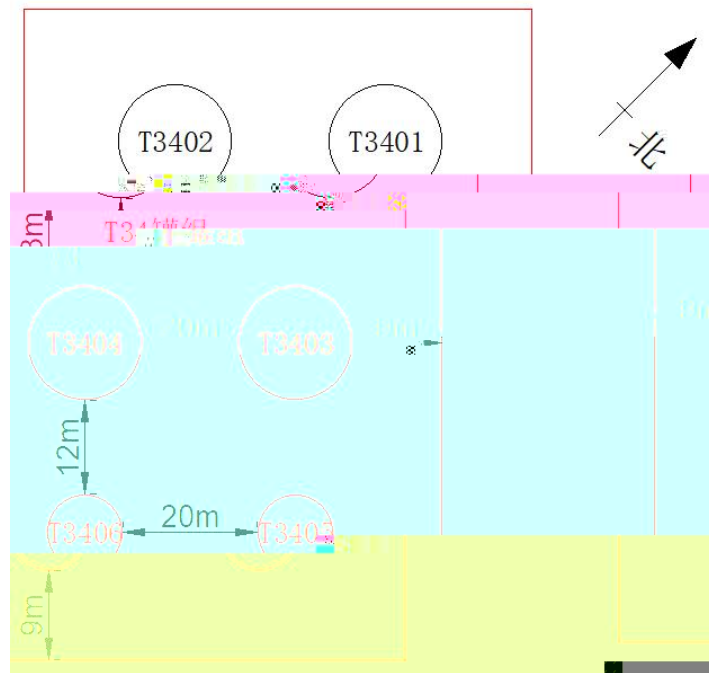
2.4-9T23

2.4-2T23

T2302 5000m ³ h=15.16m	B		9	0.5h	6.2.13	
			15	0.5h		
		T2301 5000m ³	26	5	6.2.8	
		T2304 5000m ³	10	5		
T2308 h=15.16m	B		9	0.5h	6.2.13	
T2301 h=15.16m	B		15	0.5h		

T33

4



2.4-11T34

2.4-4T34

T3404 3000m ³ h=14.081m	B	T3402	23	—	—	—
			9	0.5h	6.2.13	
		T3403 3000m ³	20	5	6.2.8	
		T3406 2000m ³	12	5		
T3406 h=12.748m	B		9	0.5h	6.2.13	
T3403 h=114.081m	B		9	0.5h		

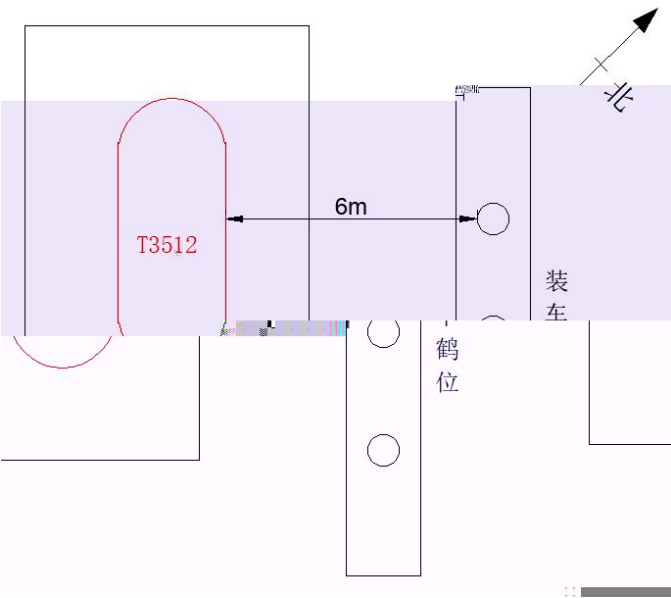
T3512

/

T3512

2.4-12

2.4-5



2.4-12T3512

2.4-5T3512

T3512			6	5	6.4.2 3	

T35

9

T3504

T3509

T3501~3503

T3505~3508

7

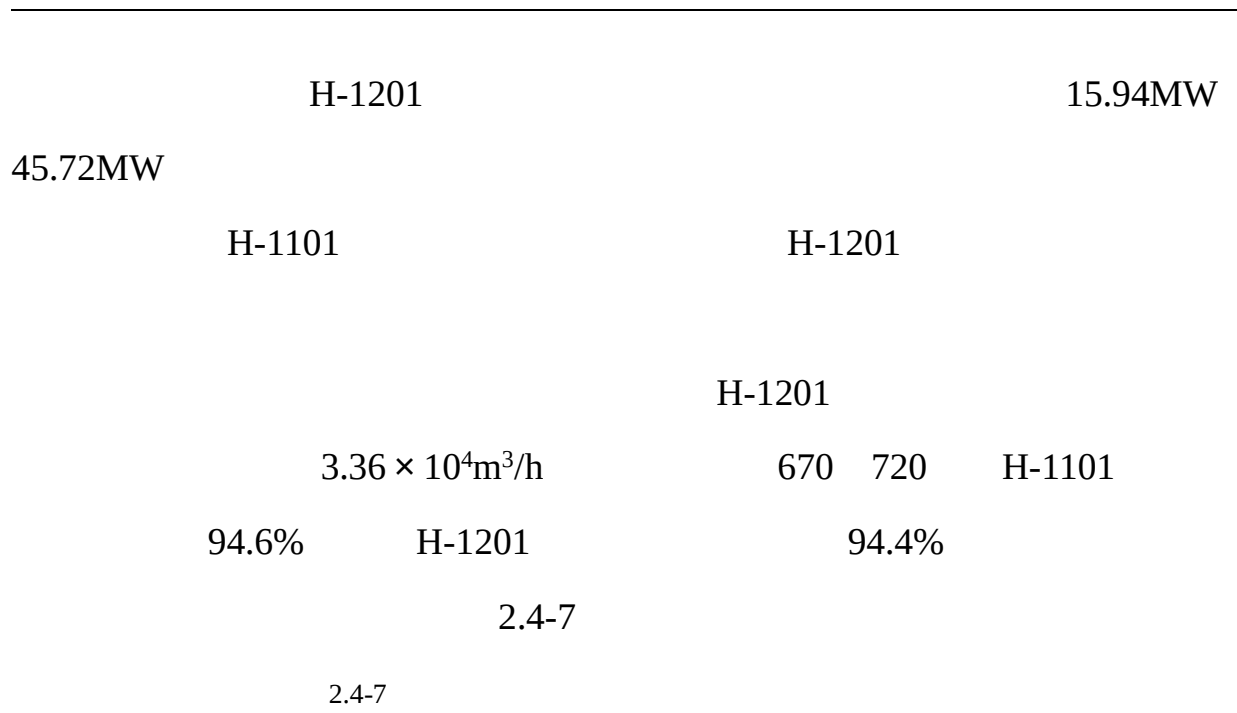
1

T35 2.4-13

2.4-6

2.4-6T35

T3502 20000m³ h=18.48m	B		12	0.5h	6.2.13
			12	0.5h	
		T3504 20000m³	B 16	5	6.2.8
		T3509 500m³	B 32	5	
		T3501 5000m³	B 24	5	



5%

2020

2020 340

80mg/m³

2

1

F01A/B

F02

68.5MW F01A 44.5MW F01B 25.6MW

F02 3

18.6 ×

10⁴m³/h

580 720

92.6%

2.4-8

2.4-7

16~23	580~720	30	25	18.6	92.6
3 4 GB31570 NMHC 5~20m/s					

2

VRU-2002

2400Nm³/h

60mg/Nm³

5mg/m³

0.5mg/m³

5mg/m³

5mg/m³

5mg/m³

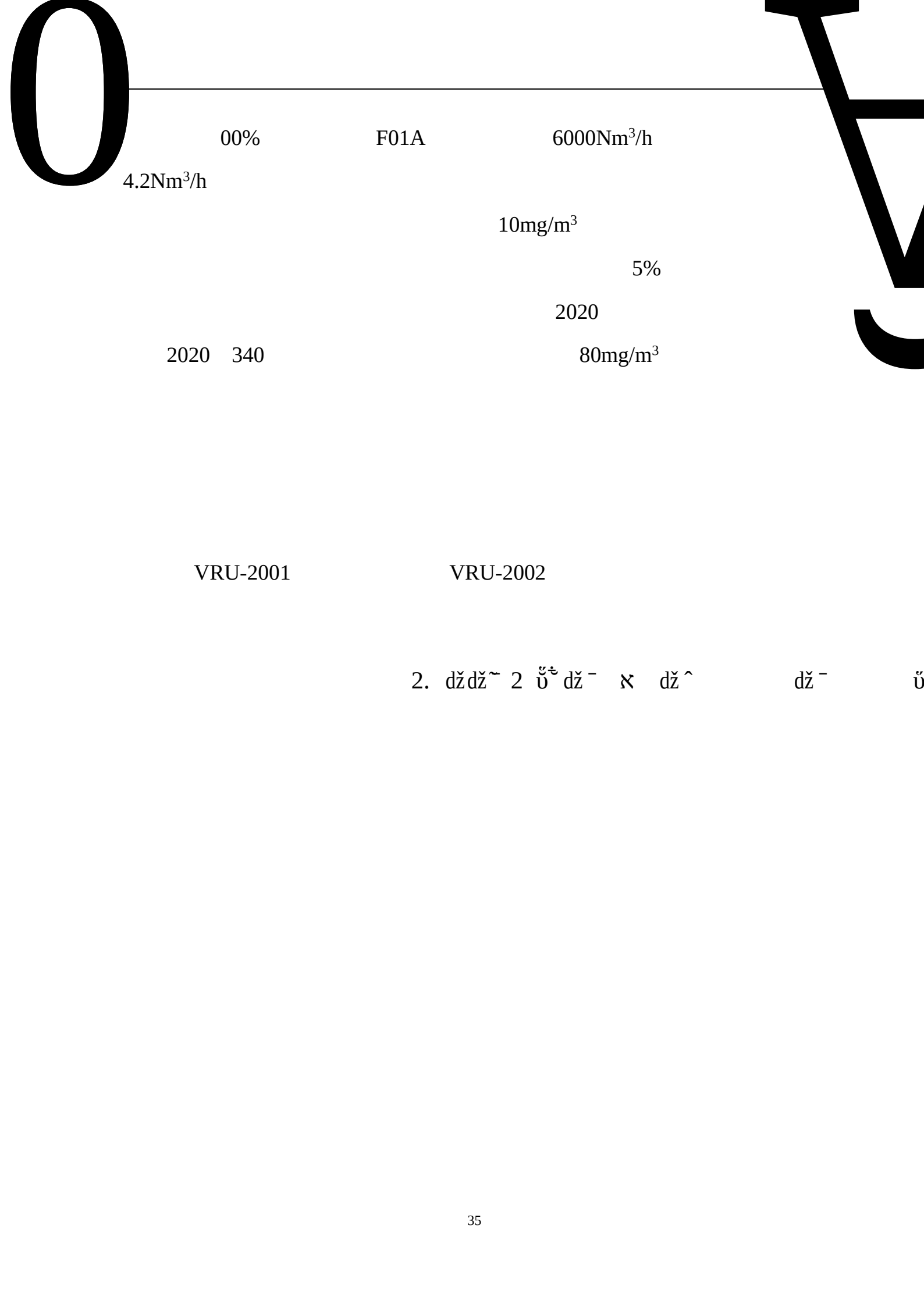
≤ 1000

2400Nm³/h

20

F01A

0.08%



00%
4.2Nm³/h

F01A

6000Nm³/h

10mg/m³

5%

2020

2020 340

80mg/m³

VRU-2001

VRU-2002

2. d $\check{z}$ d $\check{z}$ ~ 2 $\check{v}^{\check{c}}$ d $\check{z}$ ^- & d $\check{z}$ ^ d $\check{z}$ ^- $\check{v}$

2.5-1

16		T3303						120~150	2.0~12.5	/	
17		T3304						50~90	2.0~12.5		
18	T34	T3403						60~90	1.5~11		
19		T3404						60~90	1.5~11		
20		T3405						60~90	1.5~10		
21		T3406						60~90	1.5~10		
22	T35	T3501						160	2.0~11		
23		T3502						100	1.6~17		
24		T3503						160	2.0~11		
25		T3505						160	2.0~11		
26		T3506						160	1.6~17		
27		T3507						160	2.0~11		
28		T3508						160	2.2~15		
29	/	T3512			—	—		100~150	0.8~2.5		T3508

2.6

2.6.1

1

8100m³/h

VRU-2001

VRU-2002

81m³/h

2

VRU-2001

VRU-2002

1

10~15

VRU-2001

25m³/h VRU-2002

40m³/h

R404a R407c

1

5~10 VRU-2001

30m³/h VRU-2002

50m³/h

1

380/220V

2 T20

3

2.6-4

0

2.6.4

PLC

2.6-6

2.6-6

1	T20		1 2
2	T23		1 2 3 4 5 6 LEL
3	T33		1 2 3 4 5 LEL
4	T34		1 2 3
5	T35		1 2 3
6	/	T3512	1 2 3
7			1 2

12

2.6-7

2.6-7

GT-20001	VRU-2001	
GT-20002	VRU-2001	
GT-20003	P-2407A/B	
GT-20004	VRU-2002	
GT-20005	VRU-2002	
GT-20006	VRU-2003	
GT-20007	VRU-2001	
GT-20008	VRU-2001	
GT-20009	VRU-2002	
GT-20010	VRU-2002	
GT-20011	VRU-2002	
GT-20012	VRU-2001	

GDS

GDS

VRU-2001

VRU-2002

VRU-2003

/

VRU-2001

VRU-2002

VRU-2003

0.8m

2.6.6

0.5~0.7MPa

7000Nm³/h

247Nm³/h

0.5~0.8MPa

5000Nm³/h

[]

3486Nm³/h

2.6.7

VRU-2001

700t/h

100

80

3		D=3200mm H=10000mm V=80.5m ³ -0.1/	3	
4		Q=50m ³ /h H=30m 15kw	3	
5		Q=50m ³ /h H=60m 17.5kw	2	
6		D=800mm H=8000mm H=3000mm 30m ²	1	
7		50kW 110kw 5 50m ³ /h 20m	1	
8		D=2000mm H=3000mm V=9.5m ³ -0.1/	1	
9		0.3MPa 0.45MPa 20m ²	1	
10		3000mm W ×4000mm L ×3000 H	1	
1		V=1500m ³ /h P=8kPa 7.5kw	2	
2		Q=25m ³ /h H=60m 22kw	2	
3		D=1200mm H=10000mm H=3000mm	1	
4		DN200	2	

2

2.7-2

2.7-2

1		VRU-200 1		
2		VRU-200 2		

2.7-3

2.7-3

1	T20 T2001 T2002 T2004 T2005 T2006 5		1 DN200 PN16
2	T23 T2301~T2308 8		1 PN16 1 DN600 1 PN16 1 2 T2306 85 160 3 DN200 PN16 1 DN100 2 DN250 PN16 DN150 PN16 DN200
3	T33 T3301~3304 4		1 2 DN250 PN16 1 DN600 DN300 PN16 1 DN150 PN16 DN150 PN16 DN200
4	T34 4	T3403 T3404	1 PN16 1 DN600 1 PN16 1 DN250 PN16 1 DN100 2 DN150 PN16 DN200
		T3405 T3406	1 PN16 1 DN600 1 PN16 1 DN250 PN16 1 DN100 2 DN200 PN16 DN150 PN16 DN150
5	T35 T3501~3503 T3505~3508 7		1 T3502 3506 2
6	/	T3512	1 PN16 1 DN500 DN100 PN16 1 DN100 1
7		3	

2.7.2

2.7-1

 $\angle$

2015

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[2015]75

		<		2016
>		[2016]	137	
		[2017]	19	
		2020	38	
			[2024]	86
2.7.3				
		VRU-2001		P2407A/B
			56m ²	4.0m
		2.8		
2.8.1				
		HSE	6	HSE
			5	24
				22
				6
2.8.2				

3.

3.1

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8	—	—	—	—	—	—	B	>120	—	—
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9	6833
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3.2

6

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GB/T37243-2019

4.2

4.3

GB18218

1

4.4

4.2

4.3

C.4.1

3

3.5.2

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[2016]13

3

C.8

40m

3

40m

3

40m

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5.0-1

5.0-1

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VRU-2001
VRU-2002
VRU-2003
T20 T23 T33
 T34 T35
 /
T3512

2

3

VRU-2001
VRU-2002
VRU-2003

6.

6.1

6.1.1

6.1-1

6.1-1

	4.32	VRU-2001	
8.75t	1.07	VRU-2002	
	3.36	VRU-2003	

6.

6.2-4

	4×10^{-5}	1×10^{-4}	1×10^{-5}	6×10^{-6}
	—	1×10^{-2}	1×10^{-3}	1×10^{-5}
	—	—	—	1×10^{-6}

6.2.2

1min

6.2-7

6.2-7

1min

	0.4
	0.2/100m
	0.9/
	0.01/
1 d=N E/V N— km·h ⁻¹ d 1 d s ⁻¹ d 1 d t =1-e ^{-dωt} ω 2	d h ⁻¹ E— d km V P t =d 1-e ^{-ωt} ω 0~t P 1min

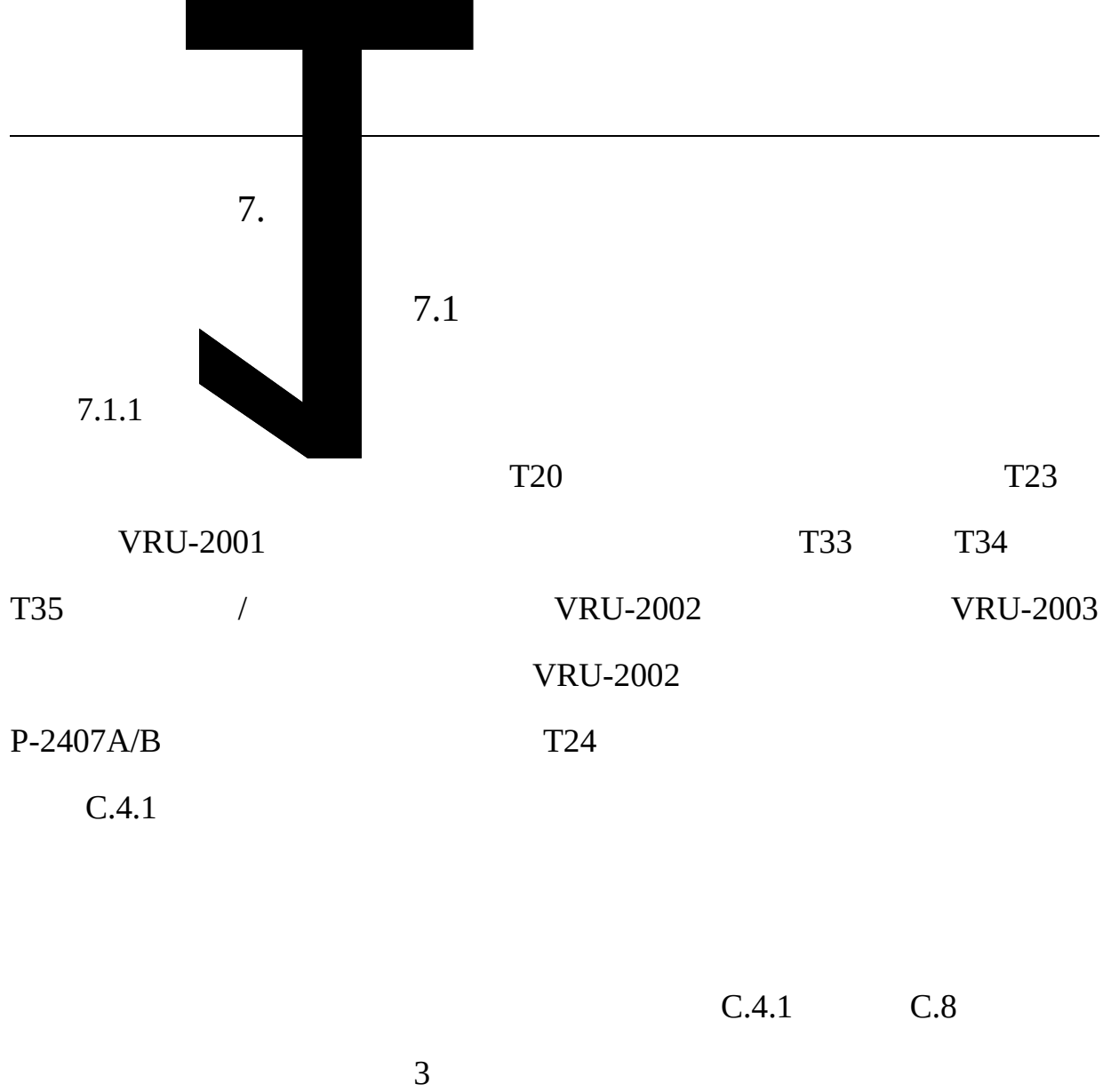
6.2.3

C.6

6.2-8

6.2-8

1	VRU-2001	T2301
2	VRU-2002	T32
3	VRU-2003	T3509



7.1.2

1

7.1-1

7.1-1

10.5

-5.5

26.4

35.3

8
-21.1

%

65

%

8

Aøg

60

30

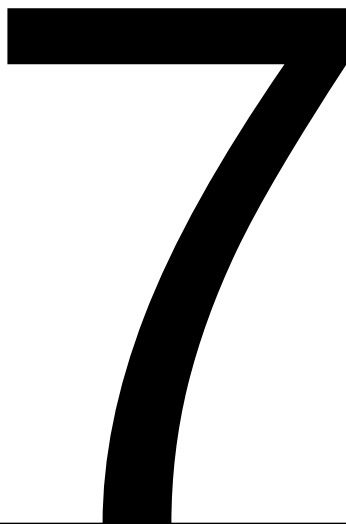
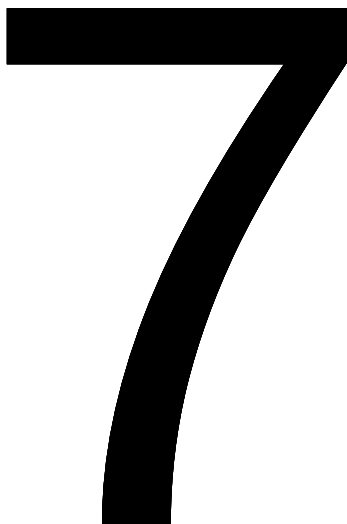
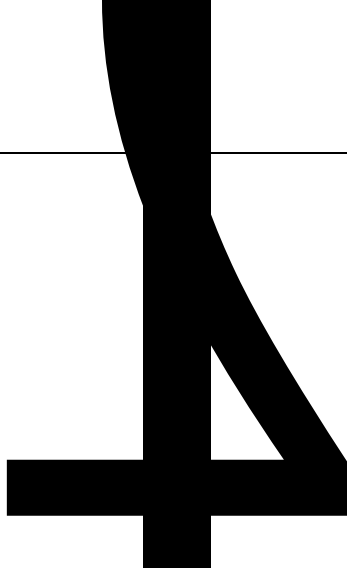
ø Æ G C
M A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

1

7

0.15g

2



40kg/m³ P-2407A/B

P-2407A/B

7

GB50201-2014

200~100

200

8

5h

7~8h

9

5

7.2

7.2.1

1

“ + ”

2

2024

[2023]7

< 2015

> [2015]75

< 2016 >

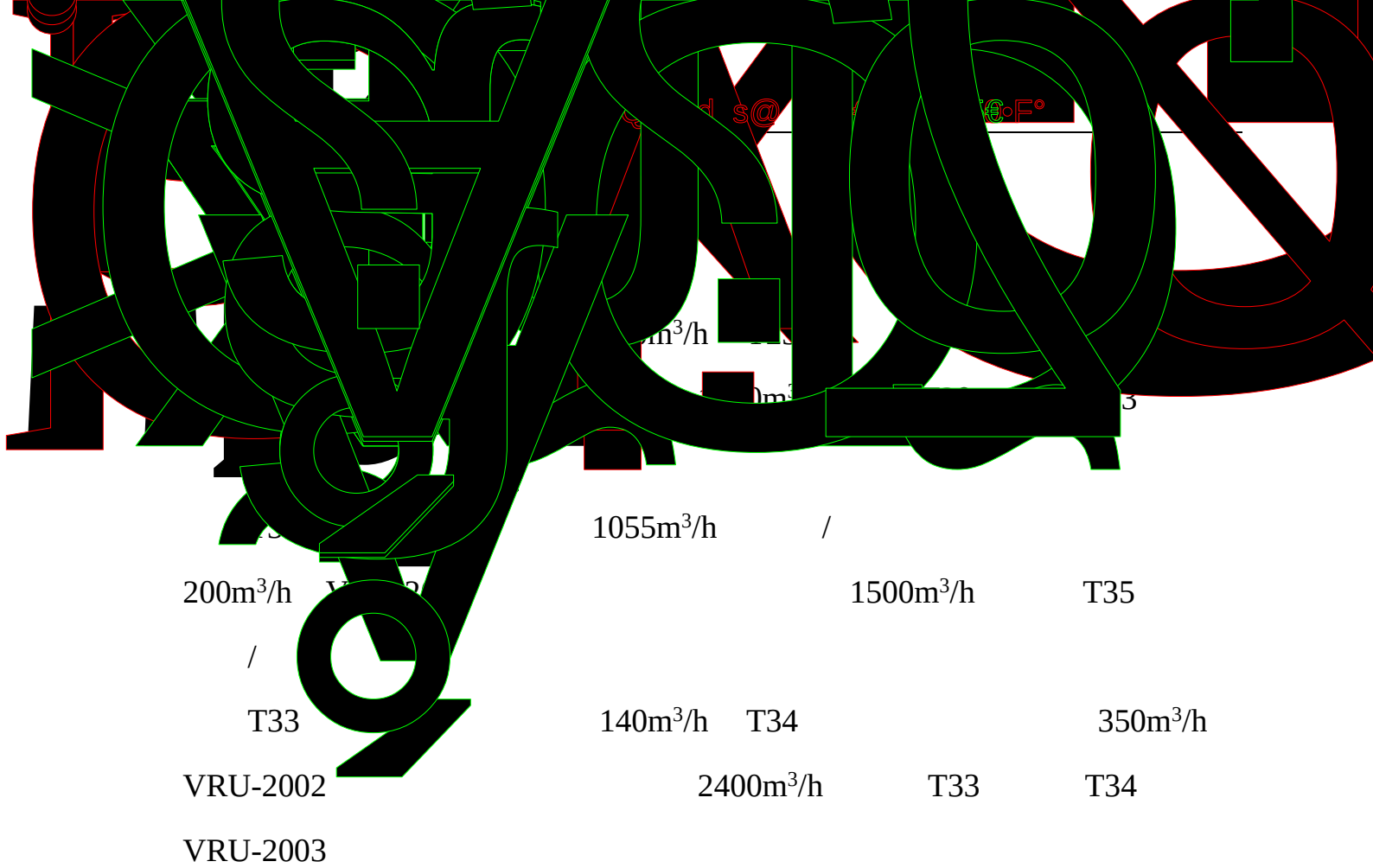
[2016]137

[2017] 19

2020 38

[2024]86

3

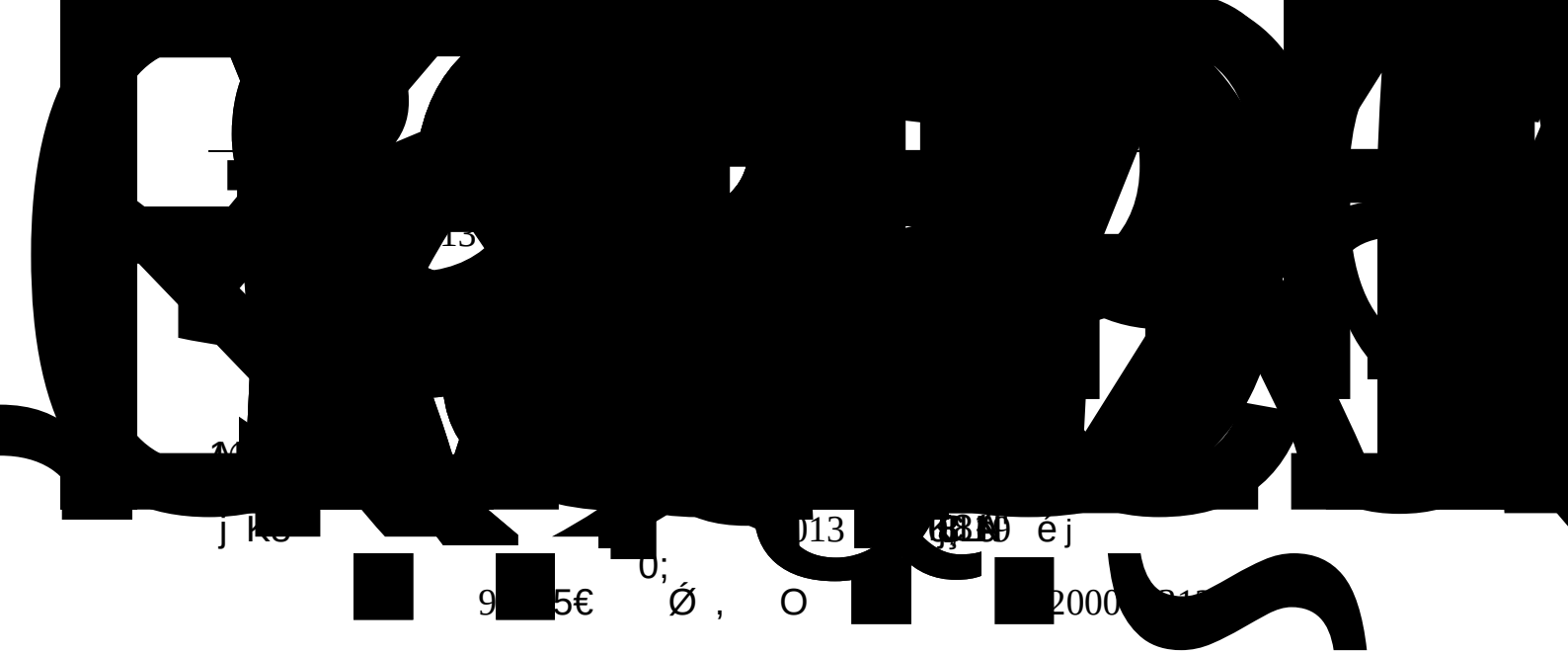


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7.2.2

	T33	T34		
		80KW	569.4KW	
	VRU-2003			
	/	T35		954KW
		433.2KW		
5		247Nm ³ /h	7000Nm ³ /h	
6	[]	3486Nm ³ /h		



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8.1.1

2018

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8.1.2

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8.1.3

1 2008

GB50316-2000

2

3

4

5

6

1

8.1.4

1

800Pa

500Pa

200Pa

200Pa

2

3

DCS

4

5

6

7

8

10m

1

T23

24

6

T32

7

2

3

4

5

UPS

			15cm
3		4.3.8	
			0.5m
4		4.3.1	
1			
2			
3			
4			
5			
5		4.3.5	
6			5.9.15
	100mm		
7			5.9.18
8		5.2.7	
1			
2			

8.2.2

2%

8

5.1.6

1

2

1

2

25

8.2.2

1

20min

2

3

4

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30	8.7.2
31	8.7.3
32	8.7.6
33	5.1.2
34	5.2.7
35	5.2.27
36	7.1.2.3
37	7.1.4.1
38	7.1.4.2
39	7.3.3.1



2

20%LEL

2

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48

5.6.1

49

5.6.2

me

on

52

6.2.3

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53

8.2.3

1

6.2.19

2

6.2.20

3

6.2.21

100 B

4

6.2.23

5

5.1.5

1

2

3

4

DN500

15		3	
4.6.2			
16		3	
4.6.3			
17		3	
5.1.1			
18		3	
5.1.2			
	500mm		
19		3	
5.2.2		2m	20m
	1050mm		
20		3	
5.2.3		20m	
	1200mm		
21	5.6.1		
22		4.0.2	

2

3

4

23

4.0.6

95.0%

0.30MPa

24

6.1.3

1

7.1.1

15		3.1.31	
16		3.1.32	
17		3.2.2	
			1m
18		3.2.8	
0.15m			
19		3.3.1	
	50mm		
25mm			
20		3.3.3	
			100mm
21		4.2.3	
22		5.8.2	
	“ ”		
23		5.8.6	
24		10.1.1	
25		10.1.2	

2		8.9.1	
			10MΩ
3		8.9.5	
	IP23		IP65
4		8.11.3	
	GB3836.15		
5		8.11.5	
	Exd BT4		
6		8.11.7	
7		8.11.8	
8		6.1.1	
9		6.2.1	
10		6.3.1	
11		5.1.1	
1			

2

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12

5.2.3

13

5.3.3

14

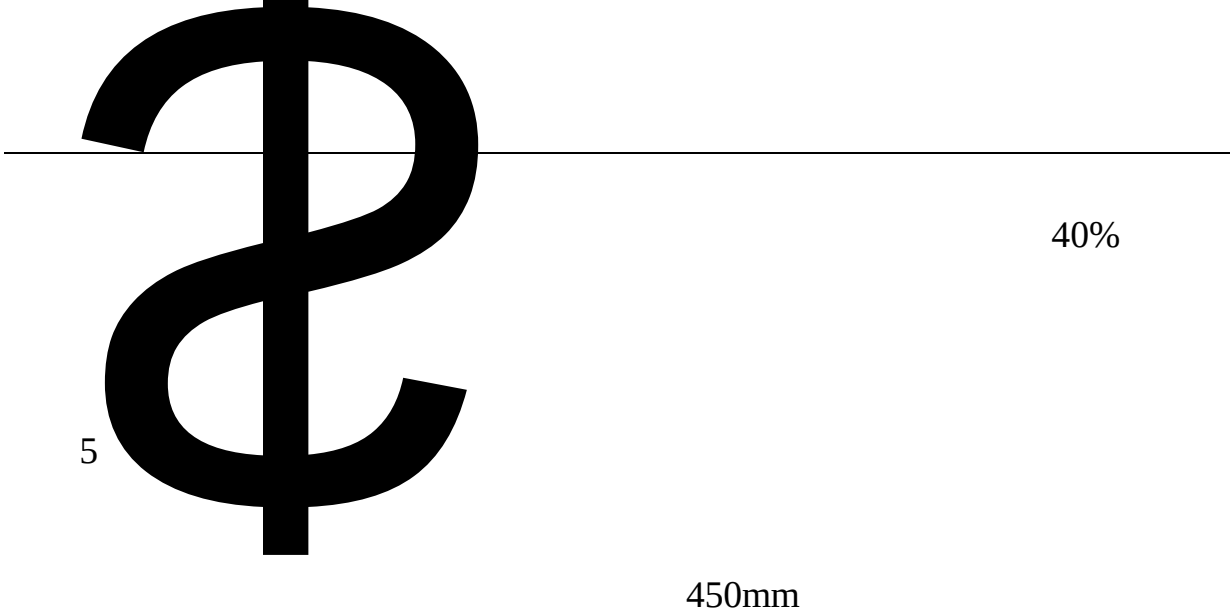
5.4.3

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16

5.5.2

17

Ê 5.5.3

1

GB/T50065

1000V

1500V

127V

110V

0

2

1

2

2

25

2

6.11

26

2

7.7.2

1

2

3

27

2

7.7.3

1

2

28

2

8.3.8.5

1

2

2

18m

18m

13

4.3.4

14

4.2.3

2

4.2.4

3

10Ω

4

30Ω

5

17

5.5.2

1

4mm

2

4mm

5.11.2

3

4mm

5.11.2

18

5.8.3

1

2

0m

1			
2			
3			
4			
5			
6			
7			
9		8.6	
1	PC		
2		100ms	
3			“
/	/	”	
4			
		15s	
10		8.7.1	
11		5.4.2.4	
12		5.4.2.5	

13	5.4.2.6	
14		3.0.2
15		3.0.3
16		3.0.4
17		3.0.6
18		3.0.8
19		3.0.9
	UPS	
20		4.1.4
21		4.1.5

	22			4.1.6
	23			4.2.1
		10m		
	24			5.3.3
	25			6.1.1
			0.5m	
	26			6.1.2
0.3m	0.6m			
	27			6.2.3
			2.2m	
	28			6.2.4
	29		9.1.1	
	30		9.1.2	

2

31

32

 $m''H$

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7.2.6

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12.0.1

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12.0.2

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12.0.5

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6	12.0.9	
7	12.0.18	
8		7.1.3
9		7.4.1
10		3.0.1
1		
2		
3		
11		4.3.4
1		
2		
3		
4		
5		
6		
12		5.3.1

3

10Ω

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10.0.7

22

10.0.8

23

10.0.9

24

10.0.12

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3.0.1

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30m

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	7			
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	2		2	
6.1				
	3		2	
6.3		GB/T 18664		
	4		2	
6.4				
		8.3		
8.3.1				
	A			B

II

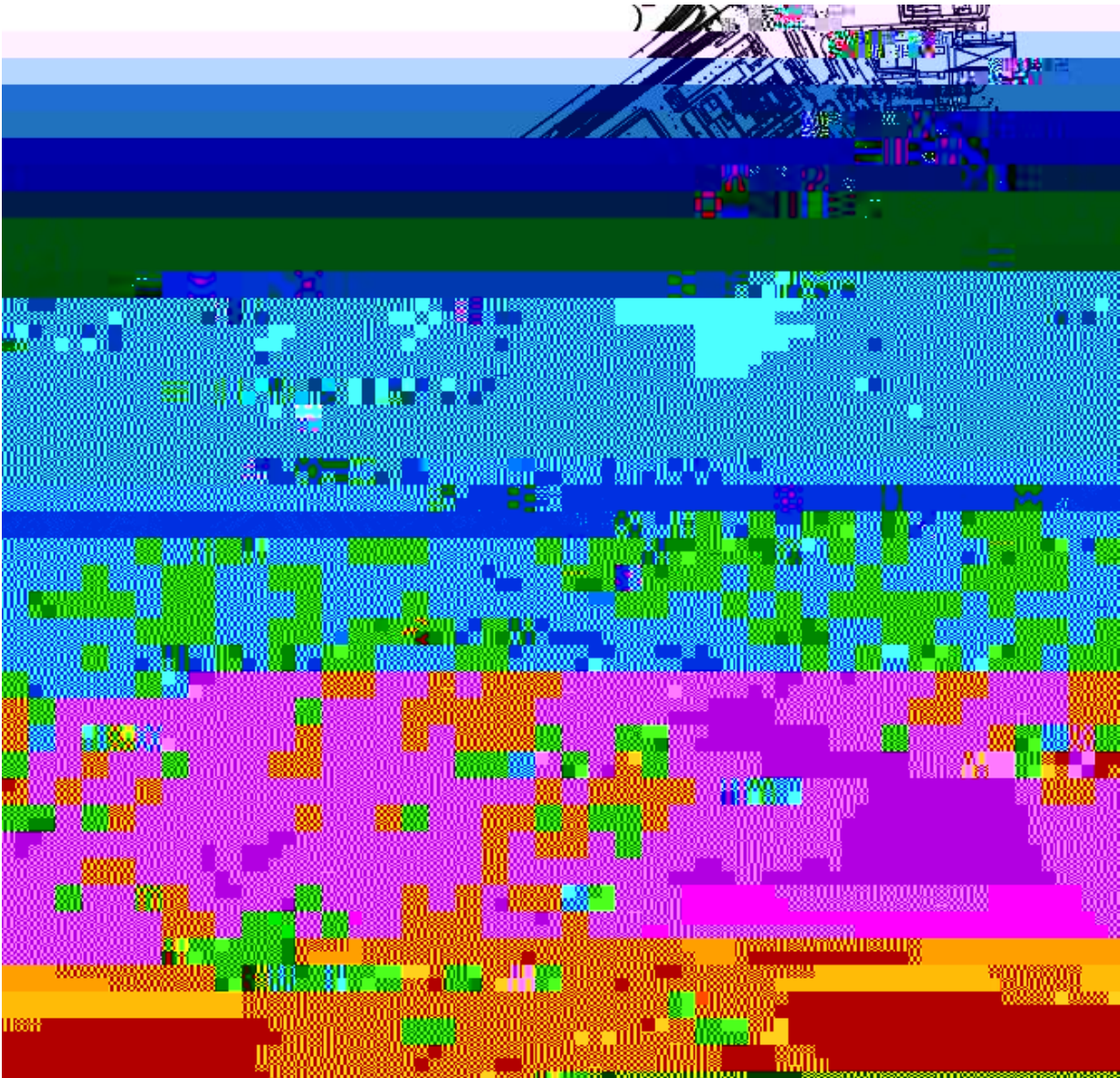
8.3.2

GB30871-2022

8.3.3

,

A.



A.0-1

附录 B 选用的安全评价方法简介

B.1

$$r = \frac{1}{2} \frac{4S}{r}^{0.5}$$

S m²

$$h = 84r \frac{m_f}{\sqrt{2gr}}^{0.61}$$

h m

r m

m_f kg/(m².s)

ρ₀ kg/m³

g 9.8m/s²

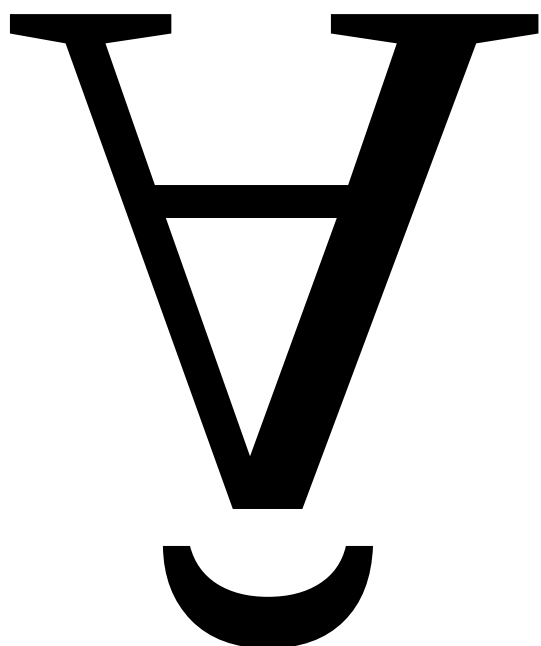
$$Q = r^2 \cdot 2 \cdot rh \cdot m_f \cdot H_C / 72 \cdot m_f^{0.6} \cdot 1$$

Q kW

Hc kJ/kg

η

0.13 0.35



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Α

С.А Б f.13

附录 C 定性、定量分析危险、有害程度的过程

C.1

[]

[]

C.1.1

C.1-1

-18 =1 0.87 0.9 282~338

15min,

	/	MPa	3.40	
-147	kPa	1026		-209.8
195.6		1	0.81/-196	
				392kPa
		980kPa	“	”
				30

C.1.2

[

C.1-4

C.1-7R407c

	R407c	R125 25% 23% R134a 52%
	-43.6 1atm 86.74 4.62MPa	
	0	ODP
	15 15	
	0 ≤30 , [13]	

C.2

C.2.1



B

A

/

R404a

52%

R407c

25%

£0.0089

Ä1

£0.0089

£

Ä1

Q

As

2

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R404a 52%

R407c 25%

“ ” /

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C.2.2

R404a

R407c

R404a

13.3KPa

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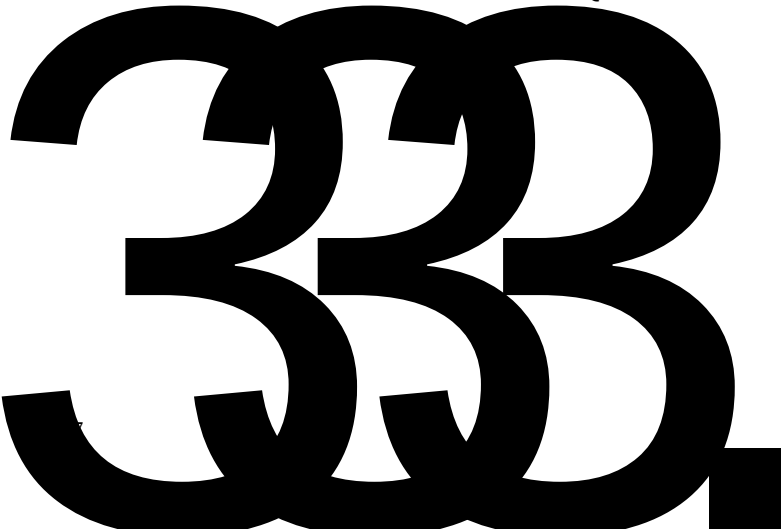
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>60

C.2.4

1

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C.2-1

	50	100	200	500	1000
	5.4	1.35	0.35	0.054	0.0135

C.2-2

50-100	45%
125	20%
200	

C.2.5

$\tilde{A}$

$\tilde{\sigma}+e$

1

2

3

C.2.6

2m

2m

ζ ₣

5

-21.4

C.3

C.3.1

GB18218-2018

1

2

$$S \quad q_1/Q_1 + q_2/Q_2 + \dots + q_n/Q_n \geq 1$$

S

C.3-1	β
	2
	2
	2
	2
	3
	3
	4
	5
	5
	10
	10
	20
	20
	20

C.3-2	C.3-1	β
	J1	4
	J2	1
	J3	2
	J4	2
	J5	1
	W1.1	2
	W1.2	2
	W1.3	2
	W2	1.5
	W3	1
	W4	1
	W5.1	1.5

	W5.2	1
	W5.3	1
	W5.4	1
	W6.1	1.5
	W6.2	1
	W7.1	1.5
	W7.2	1
	W8	1
	W9.1	1
	W9.2	1
	W10	1
	W11	1

500m

C.3-3 α

C.3-3 α

100	2.0
50 99	1.5
30 49	1.2
1 29	1.0
0	0.5

R C.3-4

C.3-4 R

	R
	$R \geq 100$
	$100 > R \geq 50$

	R
	50>R≥10
	R<10

C.3.2

3

3

1

C.3-5

C.3-6

				D=1.2m	H=14m		
VRU-200				H=5m			
1	5000	4.32	1	1	0.85t/m ³	0.00086	
					3.14×		
			1.2	2 ² ×	14-5	×0.5×0.85=4.32t	
					D=0.8m	H=8m	
VRU-200				H=3m			
2	5000	1.07	1	1	0.85t/m ³	0.00021	
					3.14×		
			0.8	2 ² ×	8-3	×0.5×0.85=1.07t	
					D=1.2m	H=10m	
VRU-200				H=3m			
3	5000	3.36	1	1	0.85t/m ³	0.00067	
					3.14×		
			1.2	2 ² ×	10-3	×0.5×0.85=3.36t	

C.4

C.4.1

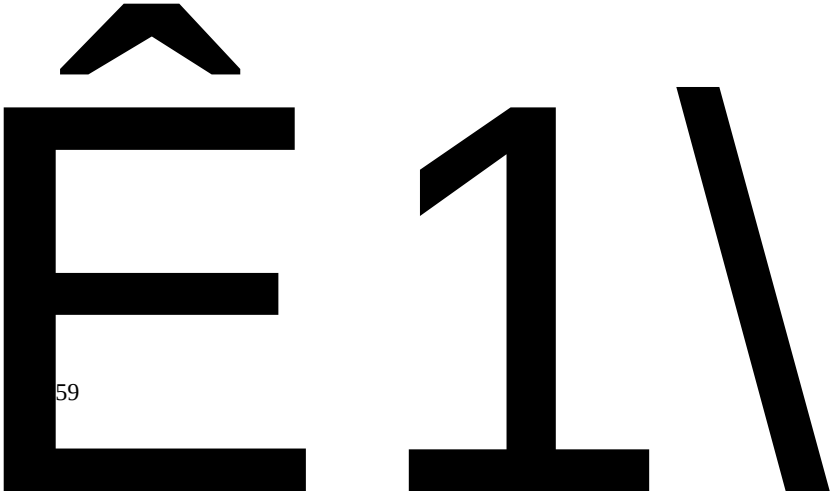
C.4-1~2

C.4-1

T2004								
10000m ³			91	35	1-25%			
B					=26.25	4.2.12	3	5
			30	30	1-25%	4.2.12	5	
					=22.5			
T2005			107	1.5×24×	1-25%			
B		24m			=27			
			220	70	1-25%	4.1.9	4	
					=52.5			
		T20	18		—	—		—
T2001			85	20	1-25%			
10000m ³		20000m ³			=15	4.2.12	5	
B			191		90	4.2.12	3	
			47	30	1-25%	4.2.12	5	
					=22.5			
			60	25×	1-25%			
					=18.75			
T2301						4.2.12	5	
5000m ³		9						
B			25	12×	1-25%			
					=9			
			15.24	12×	1-25%	4.0.12		
					=9			
							5	4.2.12
T2308			30	30	1-25%			
5000m ³					=22.5	4.2.12	5	
B			32	1.5×6×	1-25%			

		6m		=6.75		4.1.9	4
			42	20× 1-25% =15			
T2308							
5000m ³			295	70 1-25% =52.5			
B							
	T24		20	7			
T23							
	T20		19	7		6.2.14	
	T21		19	7			
			63	15			
	9					4.0.12	2
			21	10			
						4.2.12	
	000 1 B	κ	0				
	T2402						
	1505	02€					
	3000m ³ B	31.91	12				
		b	10			12 g 5 00	
		16.34	12			4.0.12	5
P-2407A/B		κ	Ϟ			ξ	

TA MO 1 C€



T3502 20000m ³ B	T3509 500m ³ B	23.77	8×	1-25% =6	4.0.12	5	
					4.2.12		
					4.0.12		
					4.2.12		
	T3501 5000m ³ B	34.84	12×	1-25% =9	4.0.12	5	
					4.2.12		
					4.0.12		
					4.2.12		
	T3502 20000m ³ B	26	20×	1-25% =15	4.2.12 7	5	

-25%

T3501 5000m ³ B			23	30× 1-25% =22.5	4.2.12 5	

C.4-2

T2006

h=17.532m							
		T3402		23	—	—	—
T3404	B			9	0.5h		
3000m ³						6.2.13	
h=14.081m		T3403	B	20	5		
		3000m ³					6.2.8
		T3406	B	12	5		
		2000m ³					
T3406	B			9	0.5h		
h=12.748m							
T3403	B			9	0.5h	6.2.13	
h=114.081m							
T3512				6	5		6.4.2
						3	
				12	0.5h		
				12	0.5h	6.2.13	
T3502	B	T3504	B	16	5		
20000m ³		20000m ³					
h=18.48m		T3509	B	32	5		
		500m ³				6.2.8	
		T3501	B	24	5		
		5000m ³					
				12	0.5h		
						6.2.13	
T3506	B	T3504	B	13	5		
20000m ³		20000m ³					
h=18.48m		T3508	B	17	5		
		5000m ³					
		T3507	B	24	5	6.2.8	
		5000m ³					
T3508	B	T3507	B	6	5		
5000m ³		5000m ³					
h=16.6m				9	0.5h		
T3507	B			8	0.5h	6.2.13	
5000m ³							
h=15.17m		T3505	B				
		5000m ³					

T3505
5000m³

B

T3504
200

B

6.2.8

5			VRU-2001 VRU-2002 VRU-2003	—

C.4.3
+O×vλwλC÷

vλ ð # »

C.4-3
B10.1€bQ•b

>ZC.4-3

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C.5

4

C.5-1

C.5-2~4

C.5-1

C.5.1

C.5-2

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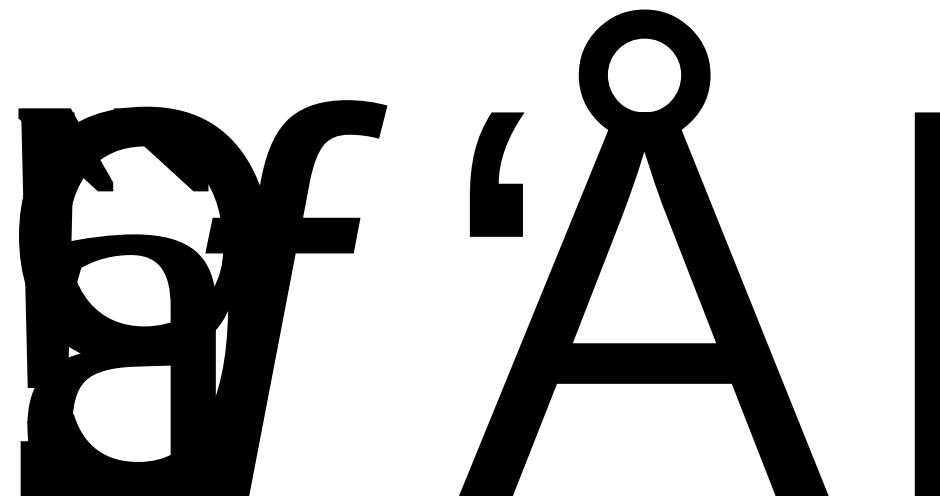
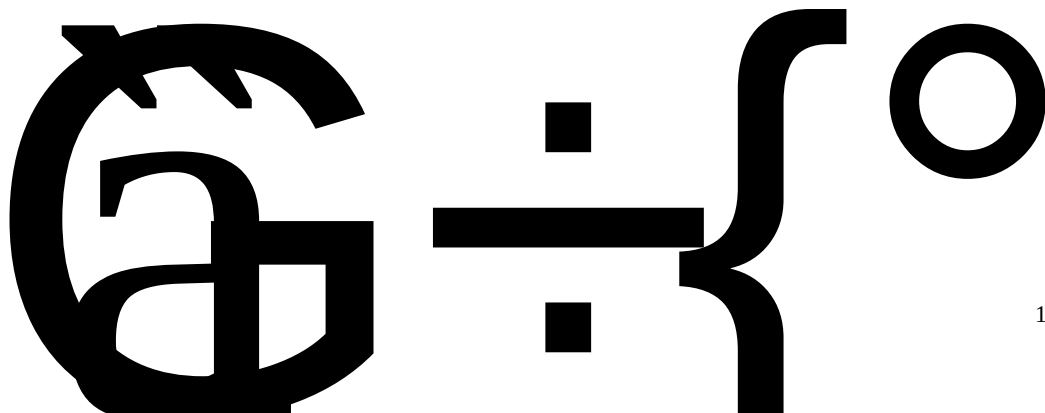
7

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		4		5			3
				6			4
		5		7			5
		6		8			6
							7
				1			1
				2			2
				3			3
							4
							5
							6
							7
		1					1
		2					2
		3					
		4		30mA/S			3
		5					4
		6					

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C.6

3

C.6.1

C.6-1

C.6-1

m ³	15.83	4	11.3
	-	-	-
	POOLFIRE	POOLFIRE	POOLFIRE
kg	4320	1070	3360
kJ/kg	44800	44800	44800
kJ/(kg.K)	2.0	2.0	2.0
kJ/kg	240	240	240
K	583	583	583
s	20	20	20

C.6.2

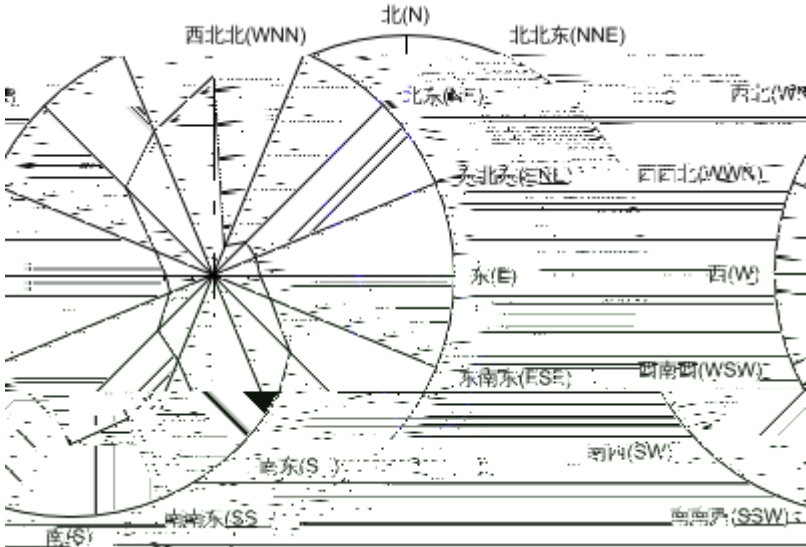
C.6-2

C.6-1

C.6-2

	()

	C
	101000
	5.4
	1.293
	283.5
	0.03



C.6-1

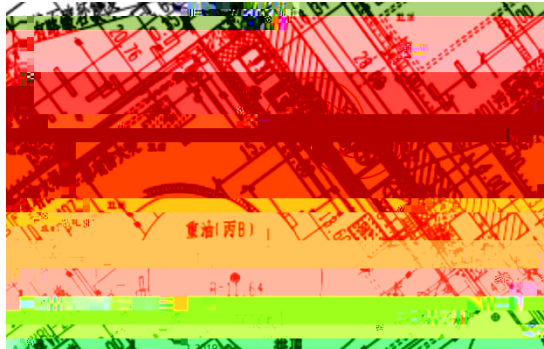
C.6.3

C.6-3

C.6-3

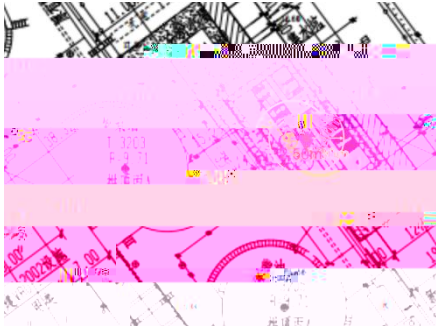
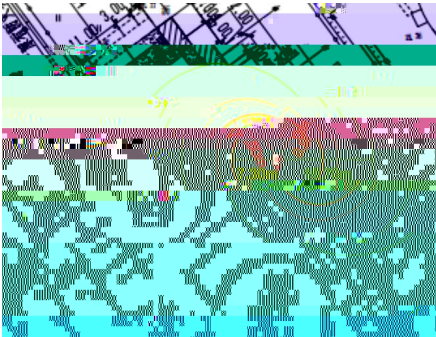
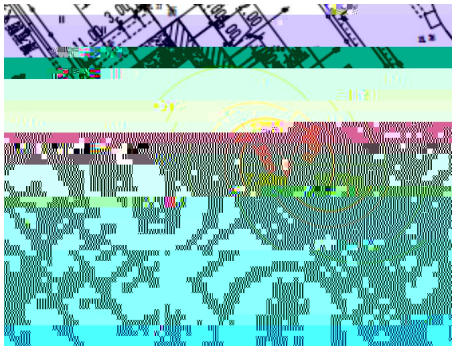
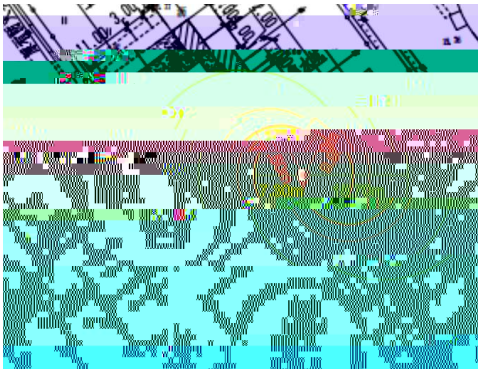
C.6.4

C.6-4VRU-2001



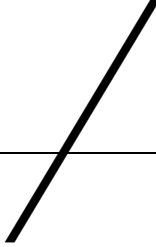
0.00004
M'

C.6-5VRU-2002

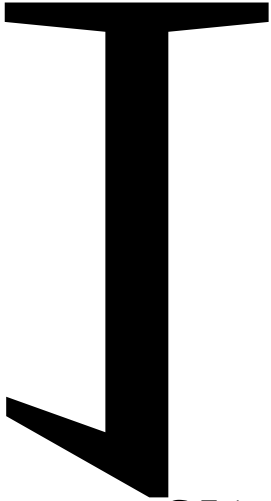
-		0.00004 2.5m 3.4m 5.8m 2.5m
-		0.00001 7.5m 9.9m 15.7m 7.3m
-		0.00001 7.5m 9.9m 15.7m 7.3m
-		0.00002 7.5m 9.9m 15.7m 7.3m

VRU-2002

T32



C.7



C.7.1



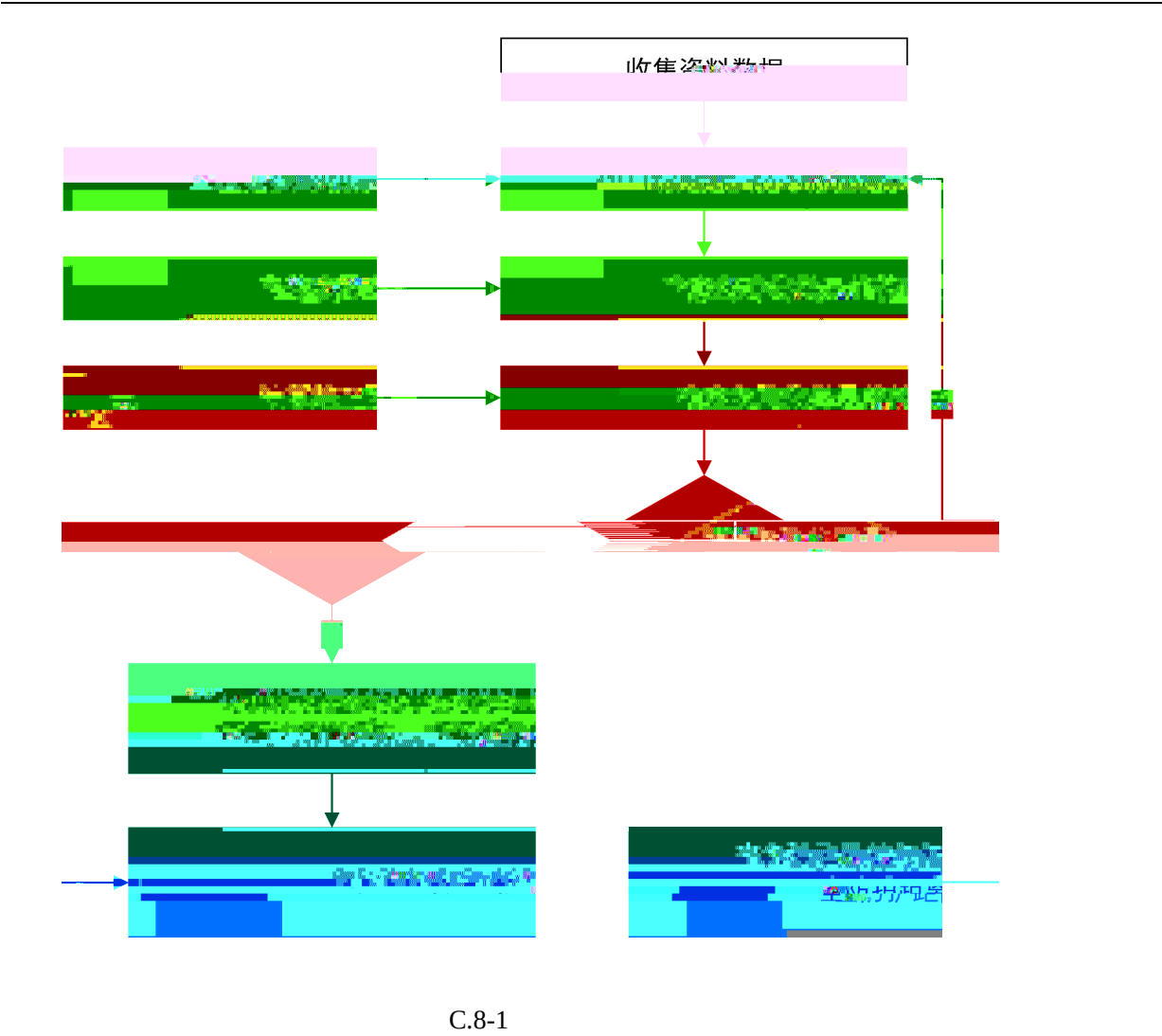
C.6-2 o ,

				0
				0
		-		21.97
				12.57
				0
				0
				21.97
				12.57
				0
				0
VRU-2002		-		3.65
				2.45
				0
				0
		-		10.50
				6.30
				0
				0
		-		10.50
				6.30
				0
				0
		-		10.50
				6.30
				0
				0
VRU-2003		-		3.88
				2.58
				0

				0
				15.17
				8.87
				0
				0
				19.29
				11.09
				0
				0
				19.29
				11.09
				0

182

C.8



/

C.8-1

C.8-1

	2.1	a13%		
		b12%		
	2.1	45%		
	LPG			

3P 27
3P

3PG 23 ≤ ≤60
60 ≤93

a
i

3
PG
PG
PG

b
i
i

4.1 a
PG

4.1 Äa
PG

4.1 a PG

—	5.1 PG	a	5.1	
		b		
		c		
	5.1 PG	a	5.1	
		b	5.1PG	
		c	5.1PG	
—	5.1 PG	a	5.1	
		b	5.1PG	
		c	5.1PG	
	2.2	a	5.1	
		b		
	5.2 A B			
	5.2 C D	5.2A	B	
	5.2 E F G	5.2C	D	
	6.1 PG 2.3	LD ₅₀ ≤5mg/kg LD ₅₀ ≤50mg/kg LC ₅₀ ≤100ppm LC ₅₀ ≤0.5mg/L / LC ₅₀ ≤0.05mg/L		
	6.1 PG 2.3	5mg/kg LD ₅₀ ≤50mg/kg 50mg/kg LD ₅₀ ≤200mg/kg 100ppm LC ₅₀ ≤500ppm 0.5mg/L LC ₅₀ ≤2.0mg/L / 0.05mg/L LC ₅₀ ≤0.5mg/L		
	6.1 PG	50mg/kg LD ₅₀ ≤300mg/kg 200mg/kg LD ₅₀ ≤1000mg/kg 500ppm LC ₅₀ ≤2500ppm 2.0mg/L LC ₅₀ ≤10.0mg/L / 0.5mg/L LC ₅₀ ≤1.0mg/L		
	6.1 PG	300mg/kg LD ₅₀ ≤2000mg/kg 1000mg/kg LD ₅₀ ≤2000mg/kg 2500ppm LC ₅₀ ≤5000ppm 10mg/L LC ₅₀ ≤20mg/L / 1.0mg/L LC ₅₀ ≤5.0mg/L		

	8 PG			
	8 PG			
	8 PG			

C.8-2

C.8-2

2.1

m³

10000

2.1

t

10

8 PG		t		1
8 PG		t		10
8 PG		t		30

/

1

2

3

$$=FF_1 \quad / \quad FF_2 \quad FF_3$$

FF₁——

FF₁=1

FF₁=0.1

FF₂——

30m FF₂=1

30m FF₂=3

FF₃——

FF₃=0.3

FF₃=1

FF₃=10

$$=FH_1 \quad FH_2 \quad FH_3$$

$$FH_1\text{——}$$

$$FH_1=3$$

$$FH_1=1$$

$$FH_1=0.1$$

$$FH_2\text{——}$$

$$30m \quad FH_2=1$$

$$30m \quad FH_2=3$$

$$FH_3\text{——}$$

$$FH_3=0.3$$

$$FH_3=1$$

$$FH_3=10$$

$$F \quad \frac{q_1}{1 \quad Q_1} \quad \frac{q_2}{2 \quad Q_2} \quad \dots \quad \frac{q_n}{n \quad Q_n}$$

$$q_1 \quad q_2 \quad \dots \quad q_n\text{——}$$

$$Q_1 \quad Q_2 \quad \dots \quad Q_n\text{——}$$

$$\beta_1 \quad \beta_2 \quad \dots \quad \beta_n\text{——}$$

C.8-3

F			
$10 \leq F$	100		
$100 \leq F$	100		
$F \geq 1000$			

C.8.2

!

A-

C.8-7

	100	8.75	VRU-2001 4.32t VRU-2002 1.07t VRU-2003 3.36t

/

C.8-8

C.8-8 /

	VRU-2001	1	3	0.3	0.9
	VRU-2002	1	3	0.3	0.9
	VRU-2003	1	3	0.3	0.9

C.8-9

C.8-9

	VRU-2001		100	4.32	0.9
	VRU-2002		100	1.07	0.9
	VRU-2003		100	3.36	0.9

$$F = \frac{q_1}{Q_1} + \frac{q_2}{Q_2} + \frac{q_n}{Q_n} = 0.14$$

C.8-3

40m

2.2.1

3

40m

3

40m

D

D.1

	1				[2021]
2021	9	1			
	2				[2021] 2021
4	29				
	3				[2013]
2014	1	1			
	4				

	6					2015			
						[2022]300		2023	
1	1								
	7					[2006]3			
	[2013]63		[2015]	80		2015	7	1	
	8						[2007]	16	
	2008	2	1						
	9						[2019]	2	
2019	9	1							
	10					[2012]44			
	[2013]63		[2015]80			2015	7	1	
	11			<					
			>			[2020]38	2020	10	
23									
	12				2024				
					[2024]81	2024	2	22	
	13				<				
			>			[2024]86	2024	3	8
	14				<				
		>		[2021]12	2021	12	31		
	15				<				
2024-2026		>		[2024]2	2024	1	21		
	16				2024				[2023]
7	2024	2	1						

D.3

1		GB/T50759-2022
2		GB/T34661-2017
3		GB/T35579-2017
4		GB50160-2008 2018
5		GB50984-2014
6		SH3011-2011
7		SH/T3047-2021
8		HG20571-2014
9		SH3137-2013
10		GB/T29812-2013
11		GB/T25844-2010
12		GB/T34042-2017
13		GB/T34065-2017
14	2024	GB/T50011-2010
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