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1 9
1 9
1 11
2 12
2.1 12
2.2 12
2.3 15
2.4 17
25

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1 2021

2021 9 1

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2014 1 1

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4 2014 2015

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2018 ש

7 2011 591 2011

12 1 2013 12 7 2013 645

8 2018 708 2019 4

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2021 210

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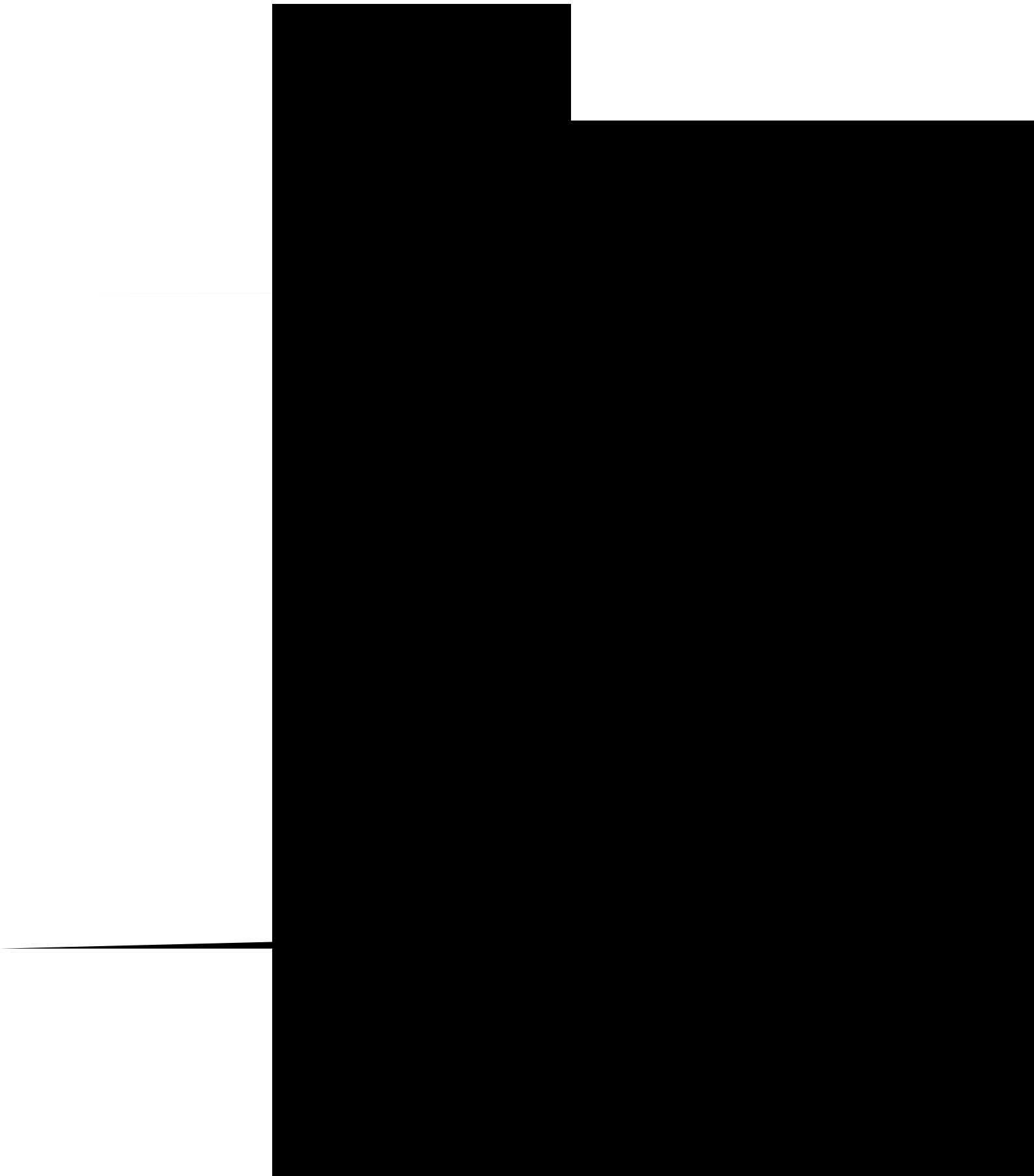
11		TSG21-2016
12		AQ/T3046-2013
13		(GB50116-2013)
14		GB50140-2005
15	2018	GB50016-2014
16		



1.5

CIT 5- -2- -4- -3-

MIT 2- -4- -3-

CIT/MIT 5- -2- -4- -3- 2- -4- -3-

BIT 1,2- -3-

OIT 2- -4- -3-

DCOIT 4 5- -N- -4- -3-

DCS

SIS

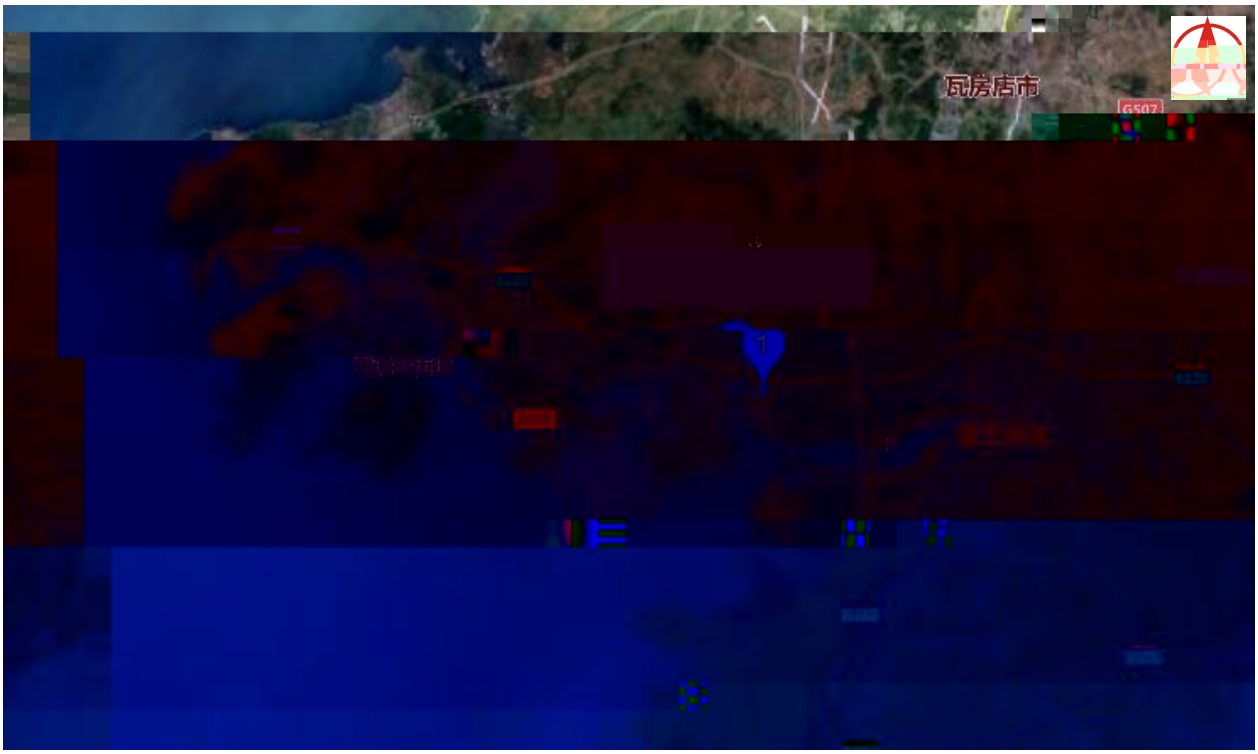
GDS

UPS

2.

2.1

2.2



2.2-1

2.2-2

2.2-2

			GB50016-2014 3.4.1
			GB51283-2020 4.2.9
			GB51283-2020 4.2.9
			GB51283-2020 4.2.9
			GB51283-2020 4.2.9 9
			GB51283-2020 4.2.9 1
			GB51283-2020 4.2.9
			GB50016-2014 2018 3.4.12
			GB50016-2014 2018 3.5.1
			GB51283-2020 4.2.9
			GB50016-2014 2018 3.5.2
			GB50016-2014 2018 3.5.2
			GB50016-2014 2018 3.4.12
			GB50016-2014 2018 3.4.12
			GB51283-2020 4.2.9
			GB50016-2014 2018 3.5.1

2.2-2

2.3

VII 0.15g

10.5

-25.1

35.3

65%

60%

70%

3.8m/s

5.0m/s

28.5m/s

25%

23%

0.67kPa

30 10min 33.0m/s

580 750mm 7 8

981.6mm

289.5mm

66.1mm

184.6㎜

218.0㎜

380㎜

40kg/㎡

18.2d

30d

1$dE

930㎜

4month

2.99m

0.54m

1.6m

-0.81m

165 185d

2600 2900h

143.3kcal/cm²

2.4 β E ṭ̀ ɔ̣ ˥

2.4-2

2.4.3

2.4-3

2.4-3

2.5

2.6

2.6.1

14

2% 650 5

2.6.2

2021 12

2024 4 10

2.7

2.7.1

DCS

SIS GDS

1

1 UPS

2

2#

≤3, Å

GDS

3 DCS

DCS -

DCS HOLLIAS MACS-K

1 7

2 2 50%

I/O 20%

3 1

4 CPU CPU

5 1:1 DCS

6 1:1

7 I/O 20% I/O

8

I/O ≥500V

50% DCS

IEC61508 SIL3

4 SIS

SIS 2.7-1

2.7-1

	SIF
1	V1215A/B/C/D V1301A/B XZV-W1201A/B/C/D XZV-W1301A/B
2	V2201/V2301 XZV-W2201 XZV-W2301A
3	V3601A/B/C/D XZV-3601A/B/C/D
4	V3301A/B 3401A/B XZV-W3315A/B XZV-3401A/B
5	V5201A/B/C/D XZV-W5201A/B/C/D
6	V7201A/V7301A/V7201B/V7301B XZV-W7201/XZV-W7301/XZV-W7201B11/XZV-W7301B11
7	V8302A/B/C/D XZV-8301A/B/C/D

5 GDS

GDS -

GDS HOLLIAS MACS-K

1 1

2 2 50%

I/O 20%

3 CPU CPU

4 1:1 DCS

5 1:1

6 I/O 20% I/O

6

SIS Hiaguard DCS GDS

DCS kM GDS SIS GDS

kM SIS DCS IP65

1

2

RF

3 IP65

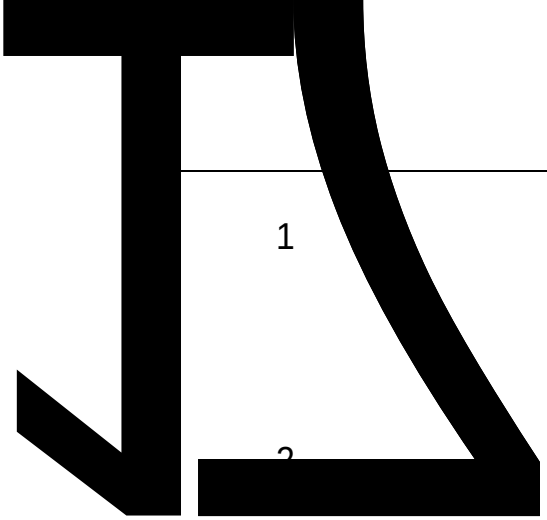
4 24V

5 WF2

WF1

1

2



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1 UPS 90min

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2.8.5

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3.1

3.1.1

: ammonium hydroxide

82503 UN 2672 35

2

3

1 30
2

3 5m
4 ( ) GB 50057

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2
2

3 ,

4

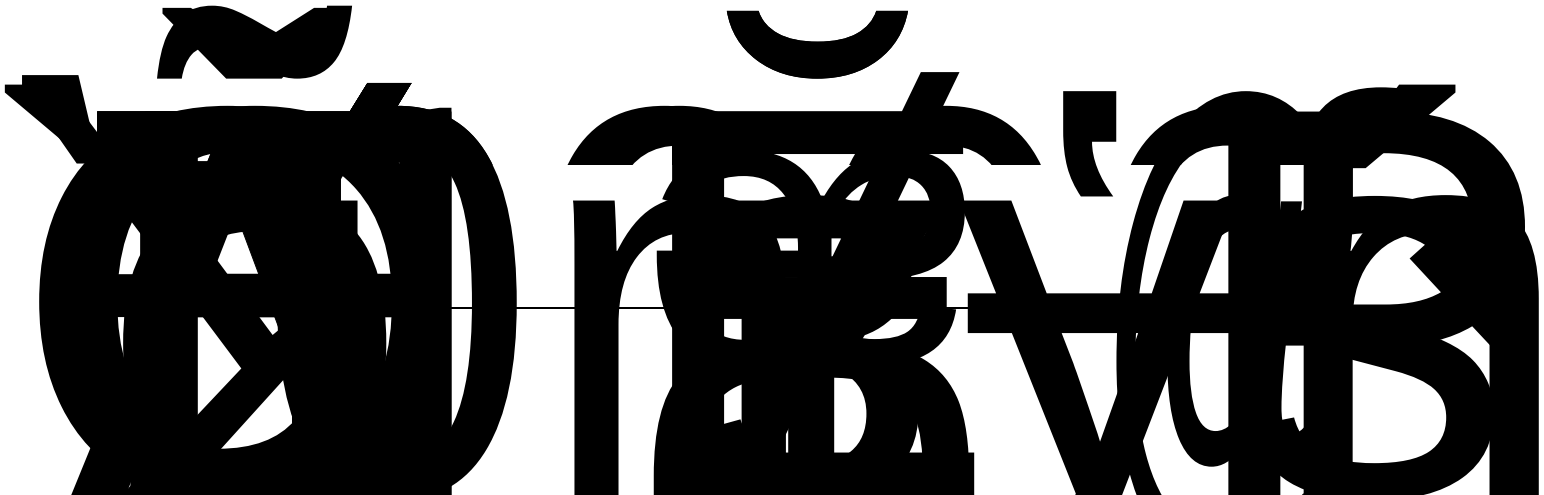
GB 7231

Ⅱ

	30m 100m 200m 150m 800m 2300m

3.1.2

:



2
3

	LD50 3700 mg/kg( ) LC50
	30

3.1.4

: methyl acrylate

32146 UN 1919 147

( ) -75) 80 (m"

LD50 277 mg/kg( ) 1243 mg/kg( ) LC50 4752mg/m^3 4
( ) (mg/m^3) 20

15

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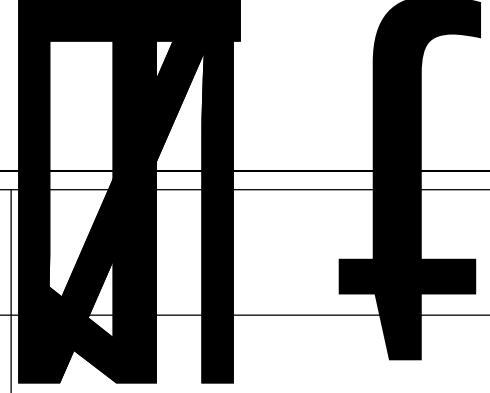


3.1.6

: Nitrogen

22005 UN 1066 172

è ┘

	18
	30

3.1.7

: o-xylene

33535

	30

3.1.8

:

61552 UN 1888 541

( ) -96.7) 39.8 (=1) 1.5

( ) 263.4 (MPa) 5.47 =1 4.12

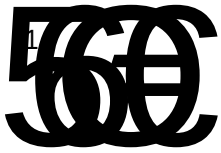
( )

(V:V%) 12-19

615

LD50 1600-2000mg

	1 2 3 1 30 2 1 2
	15 15 (NaHSO4) 100m 800m 50m



2

30

3

1

37

2

3

(V:V%) 35mg/m^3

232

(mg/m^3) 20

LD50 2140 mg/kg( )
LC50 510mg/m^3 2 ( ) 320mg/m^3 2 ( )

15

15

LC50 618 mg/m^3( ) (mg/m^3) 10

(1000mg/m3)

1

2

3

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1 Å 0

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3.1.15

: chloromethane

1591

(=1) 0.92 (=1) 1.78

( ) 632

%(V/V) 19.0 %(V/V) 7.0

LD50

LC50 5300mg/m

3 ( ) GB 50057

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MAC mg/m^3 0.5 MAC mg/m^3 :0.5

LD50

	1 2 3 4 5 1 35 85 2 3 1 2 3

3.1.19

: sodium nitrate

51055 UN 1498 2311

( ) 306.8 (=1) 2.26

	30 80

3.1.21

: hydrochloric acid;chlorohydric acid

81013 UN 1789 2507

,

( ) -114.8) 108.6 20% (=1) 1.2

=1 1.26

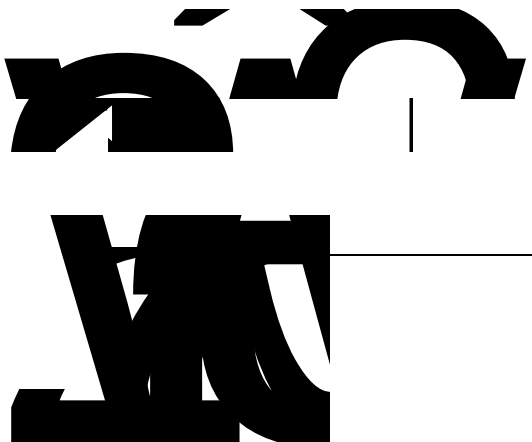
15

15

3.1.22

: 2-propanol

32127 UN 1173 111



3.1.23

	:	acetyl chloride
	2679	
	(=1) 1.11 (=1) 2.70	
	( ) 4	
	1211	
	LD50 910 mg/kg( )	
	15	
	30	

3.1.24

:

	15 15 50m 300m

3.1.25

: 1-chlorobutane

1446

(=1) 0.89 (=1) 3.20

( ) -12 ( ) 240

%(V/V) 10.1 %(V/V) 1.8

≤ kn

	30

3.1.26

: tetrahydrofuran

UN 2071

(=1) 0.89 (=1) 2.5 ( ) 268

( ) -108.5 ( ) 65.4 (MPa) 5.19

( ) -20 ( ) 230

%(V/V) 12.4 %(V/V) 1.5

3.1.28

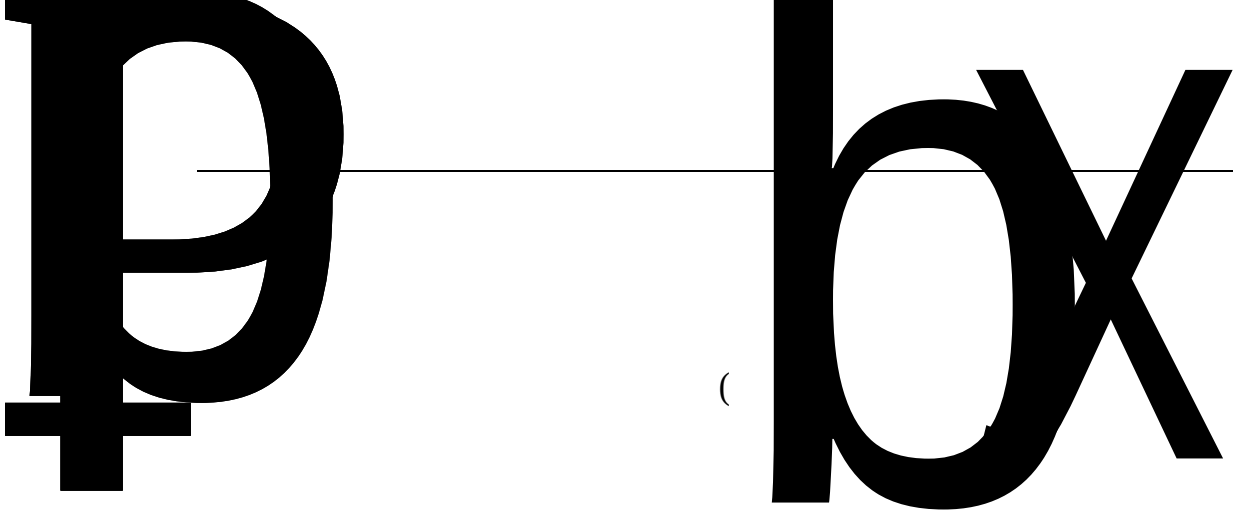
	:	formaldehyde	
	83012	CAS 50-0-0	UN 1198
	(=1) 0.82 (=1) 1.07		
	( ) 50	%(V/V 73 %(V/V)7	
	LD50 800 mg/kg( ) 270 mg/kg( ) LC50 590mg/m^3		

3.2

3.2.1

1

1



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3.2.2 Ę

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3.3.3

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3.3.4

3.2-1

3.2-1

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3.3.5

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3.3.6

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3.3.7

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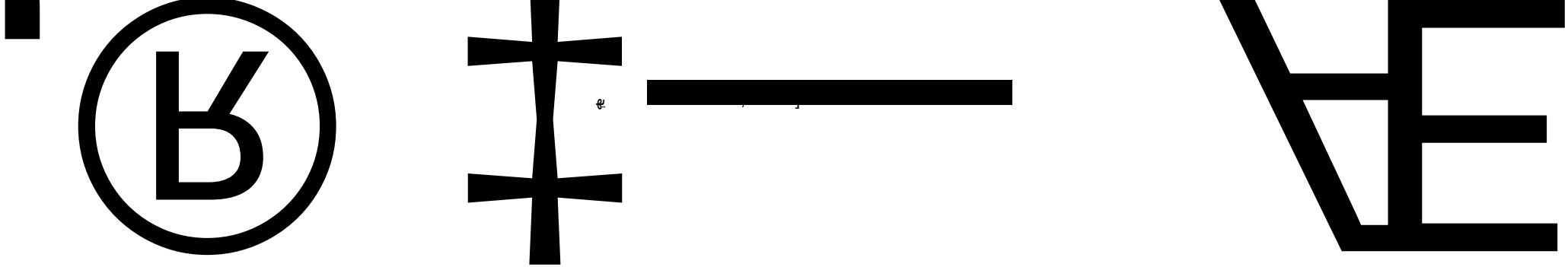
4.1-1

4.1-2

4.1-3

4.1-3 t



4.1-5

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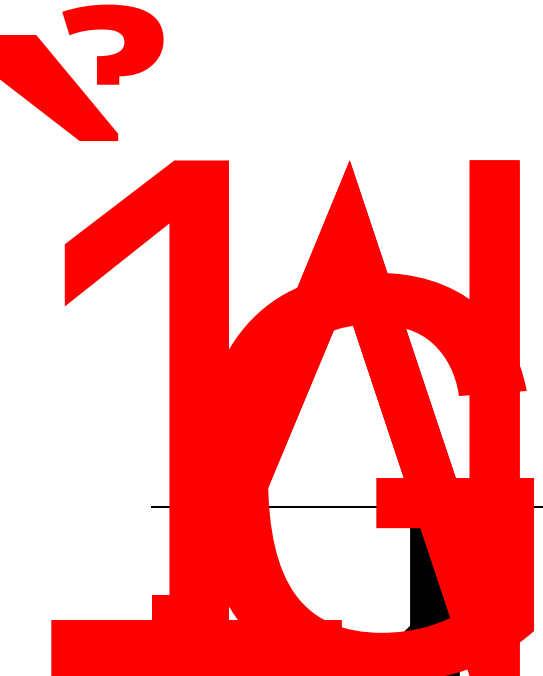
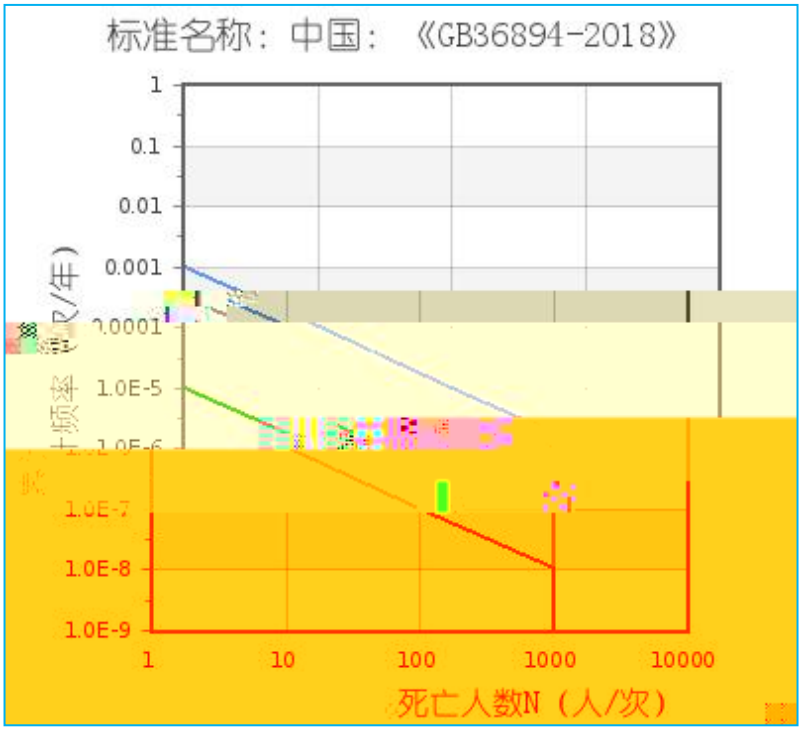
4.1.3





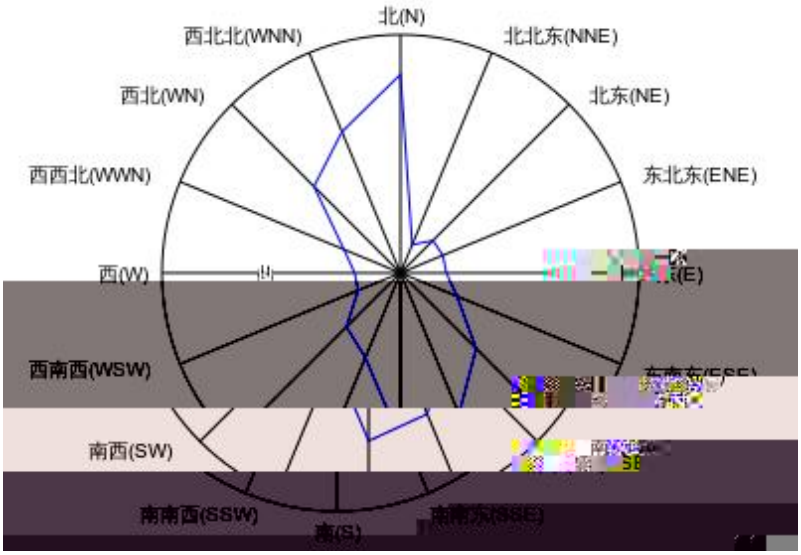
3

	（ ）
	B
pa	101
m/s	3.8
kg/m3	1.293
K	298.13
	0.03

4

/m2 :7.0E-5

5


北(N)
西北北(WNN)
北北东(NNE)
西北(WN)
北东(NE)
西西北(WWN)
东北东(ENE)
西(W)
(E)
西南西(WSW)
南西(SW)
南南西(SSW)
南(S)

4.2.2

1 1

001

145.3,193.3

m^3 0.66

-

LEAK

m^2 0.001

m 0.5

K 298

0.5

kg/m^3 1400

A -6.35

B 0.5

N 2.75

Pa 1600000

mg/m^3 1

m 0.5

kJ/(kg.K) 0.5

K 239

kJ/kg 20400

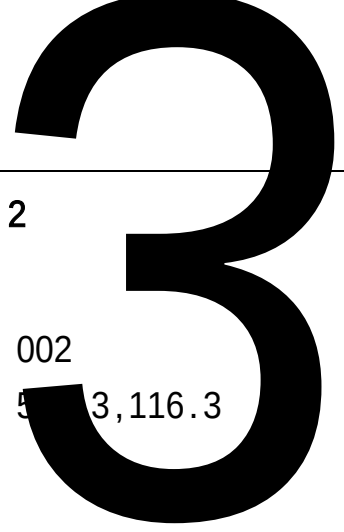
kg 50

kg

s 30

s 60

2 2



002

5 3,116.3

m^3 0.66

LEAK

m^2 0.001

m 0.5

K 298

0.5

kg/m^3 1400

A -6.35

B 0.5

N 2.75

Pa 1600000

mg/m^3 1

m 0.5

kJ/(kg.K) 0.5

K 239

kJ/kg 20400

kg 50

kg

3 3

-

003

553.1,125.2

m^3 0.8

, , ,

<10kg/s

POOL FIRE , PVE

kg 20

kg 17

kg/m^3 1540

kJ/kg 15199

kJ/(kg.K) 1.1

kJ/kg :598

K 212.7

s 20

(m) 0.84

m^3 0.8

Pa 2500000

1/Pa 0.012

4 4

-

004

561.3,125

m^3 0.8

, , ,

<10kg/s

POOL FIRE

kg 20

kg 17

kg/m^3 660

kJ/kg 34951.706

kJ/(kg.K) 1.74

kJ/kg :340

K 266.7

s 20

(m) 1.28

5 5

-

005

570.3,131

m^3 0.2

LEAK

m^2 0.01

m 0.2

K 298

1

kg/m^3 790

A -4.1

B 1

N 1

Pa 101000

mg/m^3 25

m 0.4

kJ/(kg.K) 2.51

K 337.7

kJ/kg 1102

kg 10

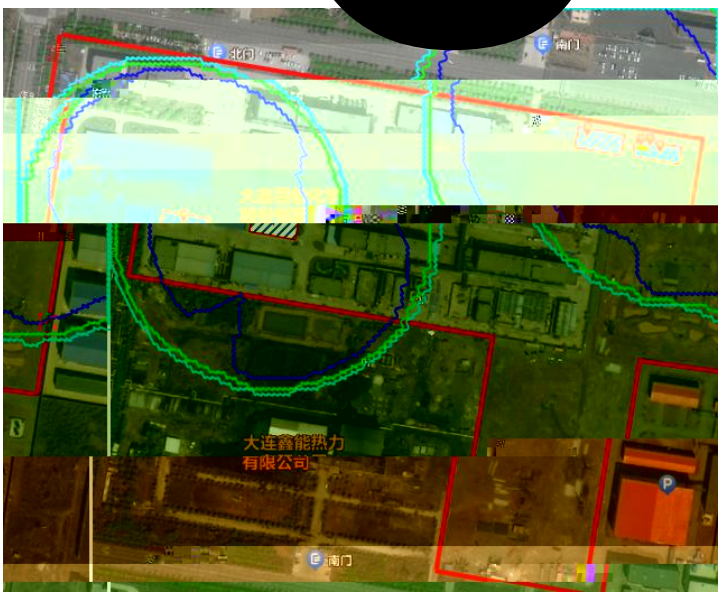
kg

s 30

s 120

1

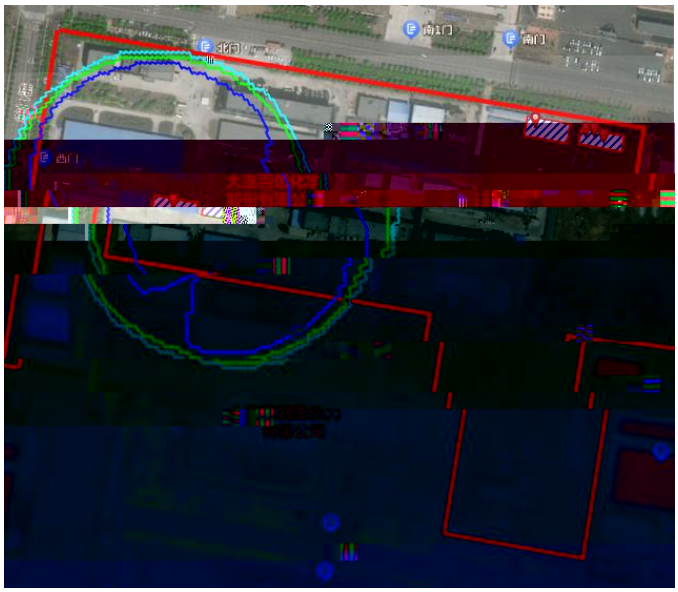
1



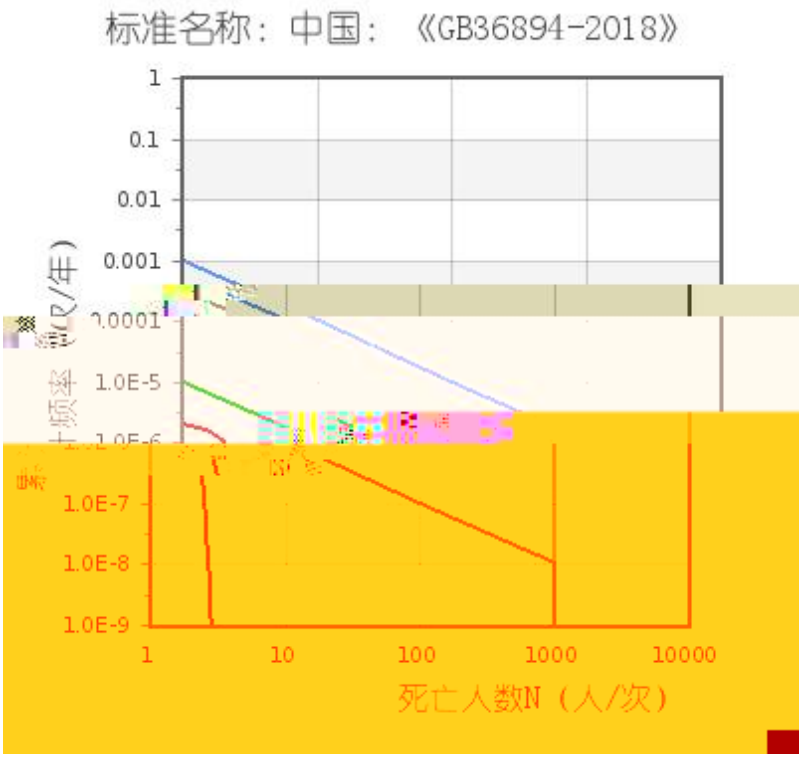
2

2

1



2

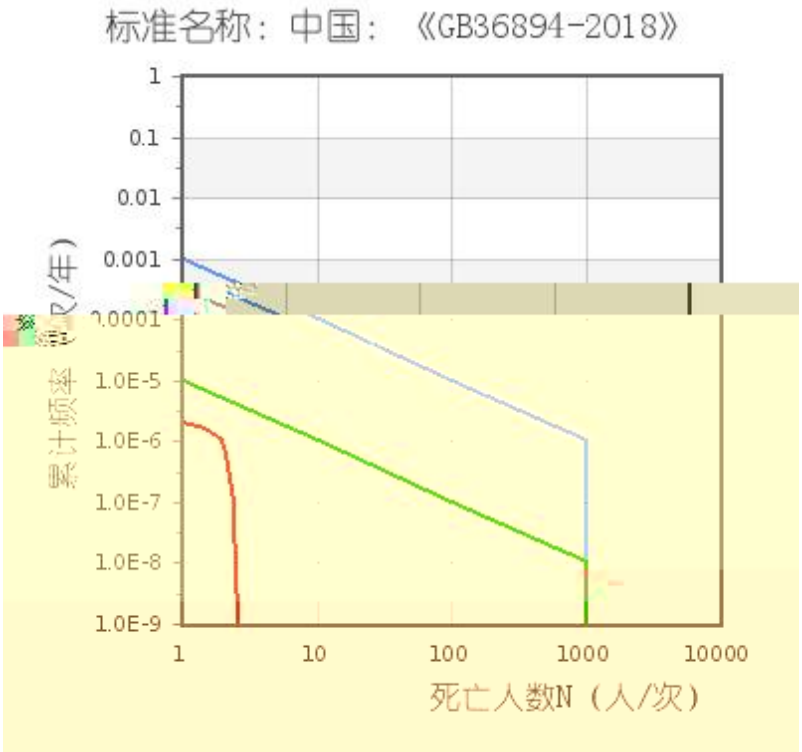

标准名称：中国：《GB36894-2018》
1
0.1
0.01
0.001
1.0E-5
1.0E-7
1.0E-8
1.0E-9
1
10
100
1000
10000
死亡人数N（人/次）

(

3

1

2



(PLL):8.3531E-6

4 -

1

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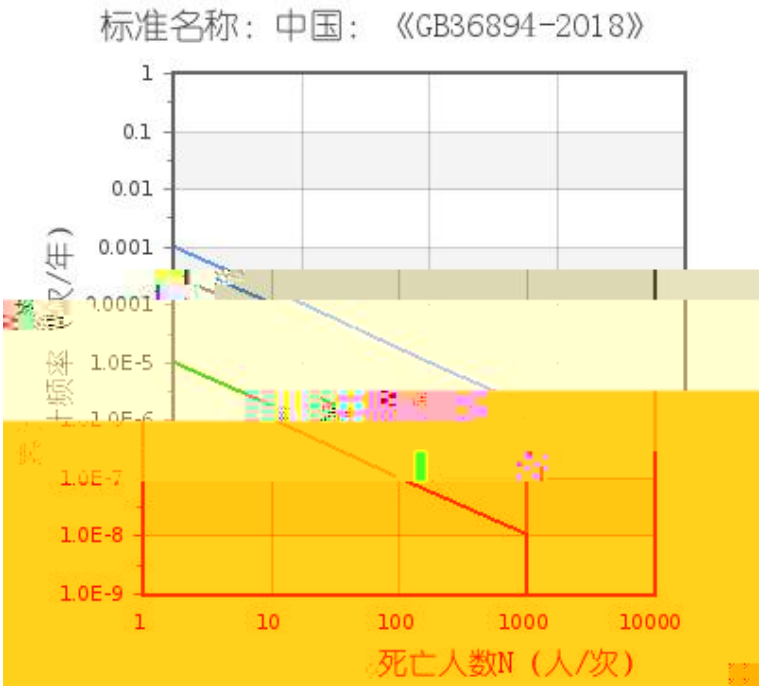
2



(PLL):9.95E-8

5 -

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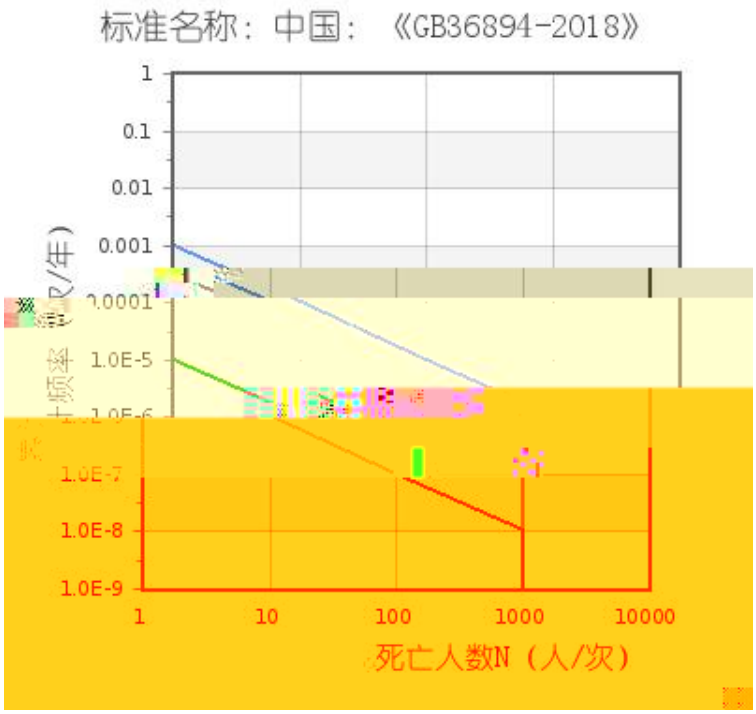
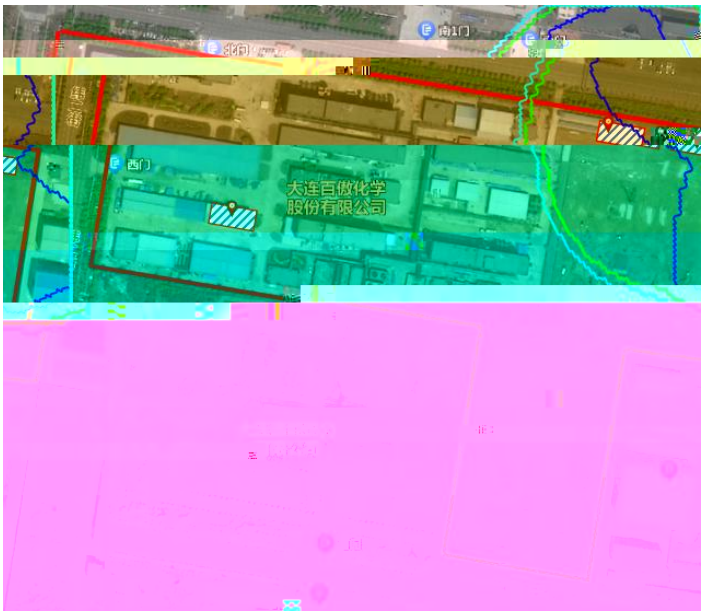


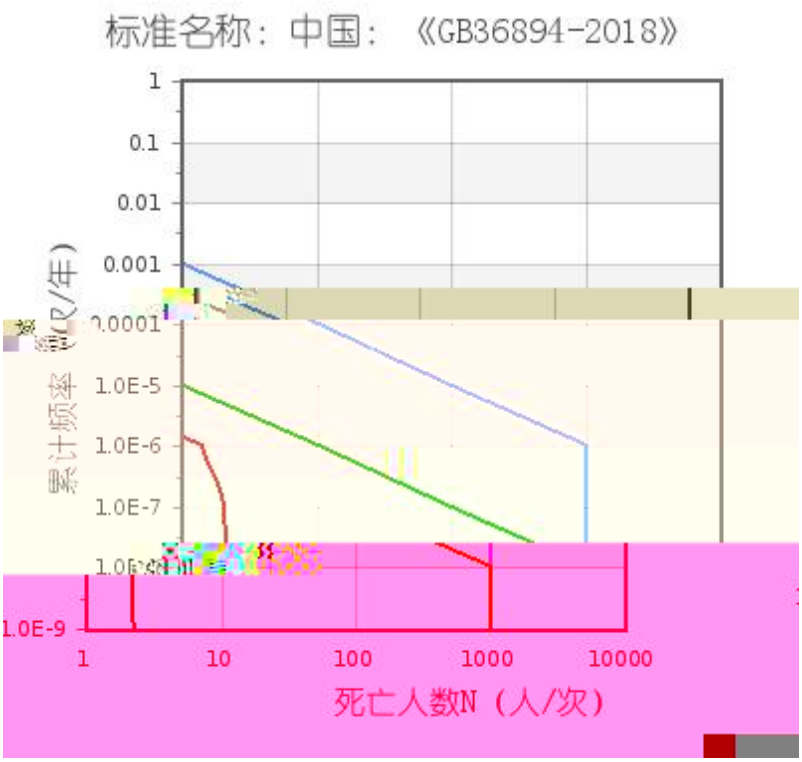
(PLL):1.774E-7

6 -

1



2



(PLL):3.5229E-6

4.2.4

1

1

(m) ,

(m)

ENE	0
NE	0
NNE	0
N	0
WNN	0
WN	0
WWN	0
W	0
WSW	0
SW	0
SSW	0
(S)	0
(SSE)	0
(SE)	1.77
(ESE)	0
(E)	0

(m)

ENE	105.47
NE	103.13
NNE	125
N	125.78
WNN	131.25
WN	130.47
WWN	128.13
W	120.31
WSW	105.47
SW	103.13
SSW	100
(S)	76.02
(SSE)	132.03
(SE)	130.47
(ESE)	128.91
(E)	121.09

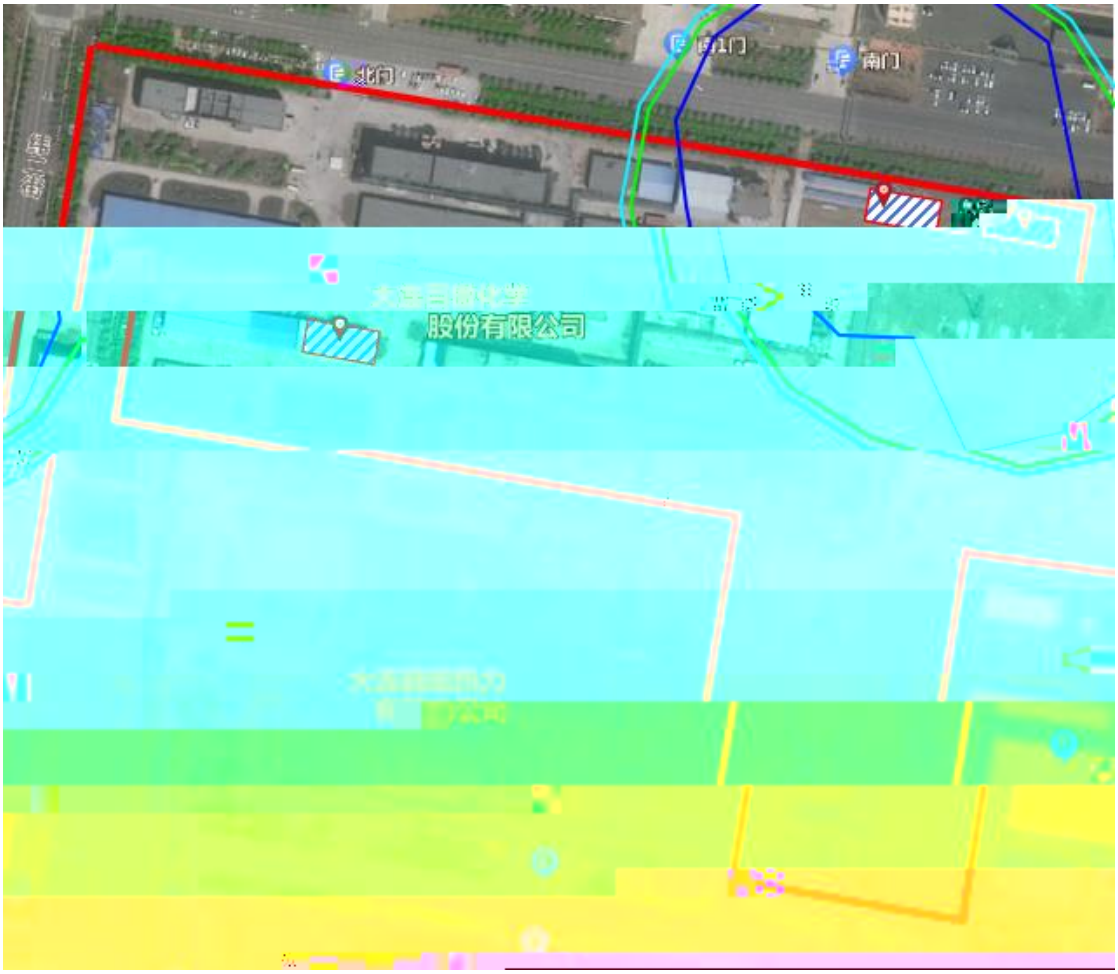
(m)

ENE	135.16
NE	135.16
NNE	136.72
N	137.5
WNN	139.06
WN	138.28
WWN	137.5
W	135.94
WSW	135.16
SW	135.16
SSW	135.16
(S)	133.59
(SSE)	139.06
(SE)	138.28
(ESE)	138.28
(E)	135.94

(m)

ENE	140.63
NE	140.63
NNE	141.41
N	142.19
WNN	142.97
WN	142.97
WWN	142.19
W	141.41
WSW	140.63
SW	140.63
SSW	140.63
(S)	139.84
(SSE)	142.97
(SE)	142.97
(ESE)	142.19
(E)	141.41

2



(m) ,

(m) ,

(m)

ENE	105.47
NE	105.47
NNE	124.22
N	126.56
WNN	131.25
WN	130.47
WWN	128.13
W	120.31

(m)

ENE	140.63
NE	140.63
NNE	141.41
N	142.19
WNN	142.97
WN	142.97
WWN	142.19
W	141.41
WSW	140.63
SW	140.63
SSW	140.63
(S)	139.84
(SSE)	142.97
(SE)	142.97
(ESE)	142.19
(E)	141.41

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;

(m) ,

(m) 4.09m

(m) 4.87m

(m) 4.87m

(m) 4.87m

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;

(m) 1.77m

(m) 2.55m

(m) 3.32m

(m) 3.32m

(m) 4.09m

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(m) ,

(m) ,

(m)

ENE	23.43
NE	26.52
NNE	72.93
N	90.72
WNN	123.44
WN	121.88
WWN	103.13
W	49.73
WSW	23.43
SW	17.24
SSW	11.83
(S)	35.03
(SSE)	125.78
(SE)	121.88
(ESE)	116.41
(E)	53.59

(m)

ENE	132.03
NE	132.03
NNE	134.38
N	135.16
WNN	137.5
WN	137.5
WWN	135.94
W	133.59
WSW	132.03
SW	132.03
SSW	132.03
(S)	129.69
(SSE)	138.28
(SE)	137.5
(ESE)	136.72
(E)	133.59

(m)

ENE	140.63
NE	140.63
NNE	142.19
N	142.19
WNN	143.75
WN	143.75
WWN	142.97
W	141.41
WSW	140.63
SW	140.63
SSW	140.63
(S)	139.84
(SSE)	144.53
(SE)	143.75
(ESE)	142.97
(E)	141.41

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$$S \quad \frac{q1}{Q1} \quad \frac{q2}{Q2} \quad \ldots\ldots \quad \frac{qn}{Qn} \quad 1 \qquad 1$$

q_1 q_2… q_n t

β_1 $\beta_2 \ldots, \beta n$ —

α —

3 β

		β
	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

4 α

500m

6.3-3 α

6.3-3 α

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

5

R 6.3-4

6.3-4 R

	R
	R≥100
	100>*R*≥50
	50>*R*≥10
	R<10

500m

α 0.5

β 6.3-1 6.3-2 6.3-2

2

β 6.3-5

6.3-5 β

	β
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α β 2

4.1.3

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4.2 c

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4.2 d

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25	a) b)	4.7.5		
26		4.7.6		
27				

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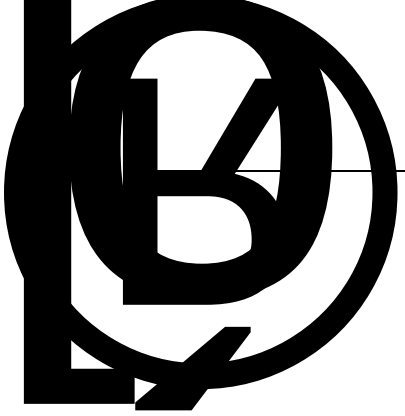

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13	NCl_3 NCl_3 NCl_3 60g/L	3.10	NCl_3	
14	50kg 100kg 500kg 1000kg	6.1.3	1000kg	
15		7.1.2		
16	500kg 1000kg	7.1.4	1000kg	
17		6.1.1		
18		6.1.5		
19		6.1.10		
20	4.1.5	4.1.5	2.2-1	
21	4.2.9	4.2.9	2.2-2	
22	4.2.9	6.5.1	2.2-1	
23		6.5.2		
24	B	6.5.3		

25		13	DCS	
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27	3 HAZOP HAZOP	2013 88	3 HAZOP 2022 9 HAZOP 2023 2 HAZOP 2024 1 HAZOP	
28	1. 2.		/	
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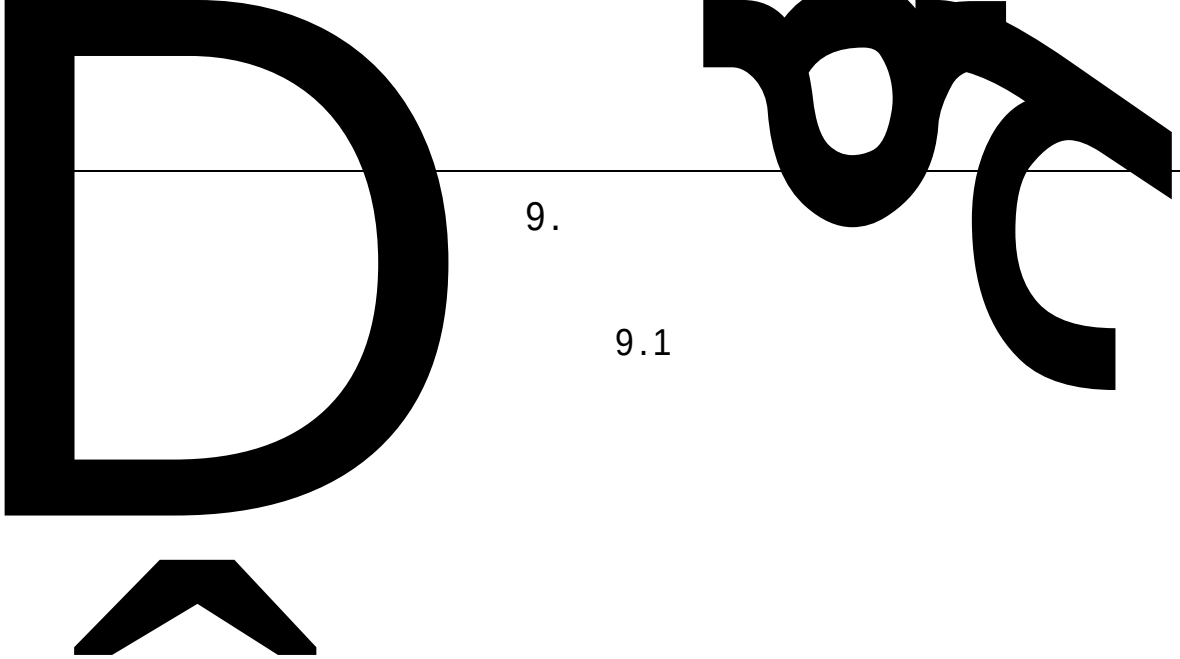

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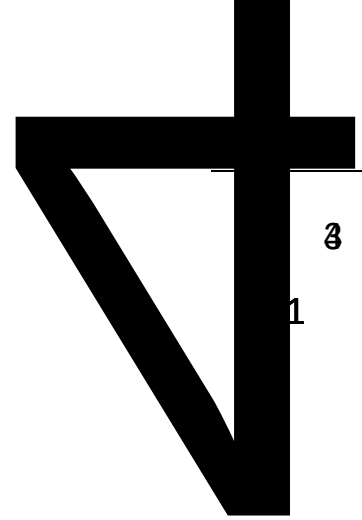

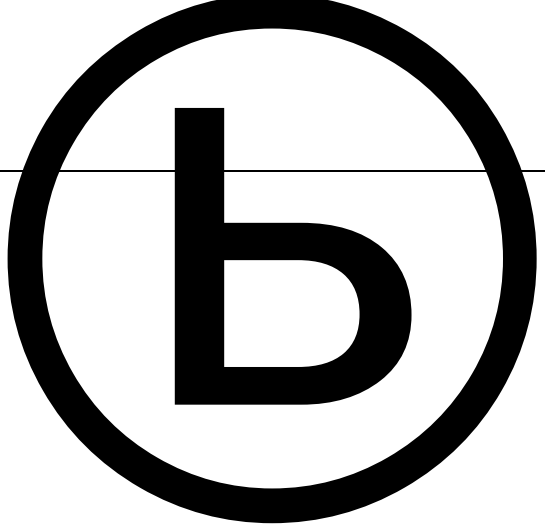

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