

2025

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1.3

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1.1	.....	1
1.2	.....	1
1.3	.....	8
1.4	.....	9
2.1	.....	11
2.2	.....	12
2.3	.....	12
2.4	.....	22
2.5	.....	22
2.6	.....	22
2.7	.....	23
3.1	.....	32
3.2	.....	43
3.3	.....	52
4.1.	.....	54
4.2	.....	54
5.1	.....	56
5.2	.....	59
5.3	.....	83
5.4	.....	84
6.1	.....	93
6.2	.....	93



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8 [2019] 708 2019 4 1

9 [2009] 549 2009 5 1

10 [2013] 645 2013 12 7

11 [2010]23 2010

7 19

12 m





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GB 50016-2018 ]

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GB 50030-2013

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GB 6912-2008

4

GB 50160-2008[2018 ]

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SH/T 3047-2021

6

SH/T 3017-2013

7

GB50489-2009

8

SH/T3019-2016

9

SH/T3092-2013

10

SH3137-2013

11

SH/T 3038-2017

12

III

GB 50433-2008 2

13

GB50650-2011 2022

14

2

III 2

GB50057-2010

15

III

HG/T 20643-2012

16

GB 7231-

15

2

27 GB 50515-2010

28 GB/T 601-1986

29 GB/T 1361-2022

30 GB 50058-2014

31 GB/T 50779-2022

32 GB 15258-2009

33 3 GB 30000.3-2013

34 6 GB 30000.6-2013

35 7 GB 30000.7-2013

36 GB/T 16483-2008

37 3 GBZ/T 229.3-2010

38 GB/T 50115-2019

39

GB/T 8196-2018

40 GB/T 3608-2008

41 GBZ 1-2010

42 1

1 2 GBZ 2.1-2019/XG1-2022/XG2-2024

43 2 GBZ 2.2-2007

44 SY/T 7354-2017

45 GBZ/T 230-2010

46 GB/T 50493-2019

47 GB 12268-2012

48 GB 190-2009

49 GB 50275-2010

50 GB 30077-2023

51 SH/T 3060-2013

52 GB 50974-2014

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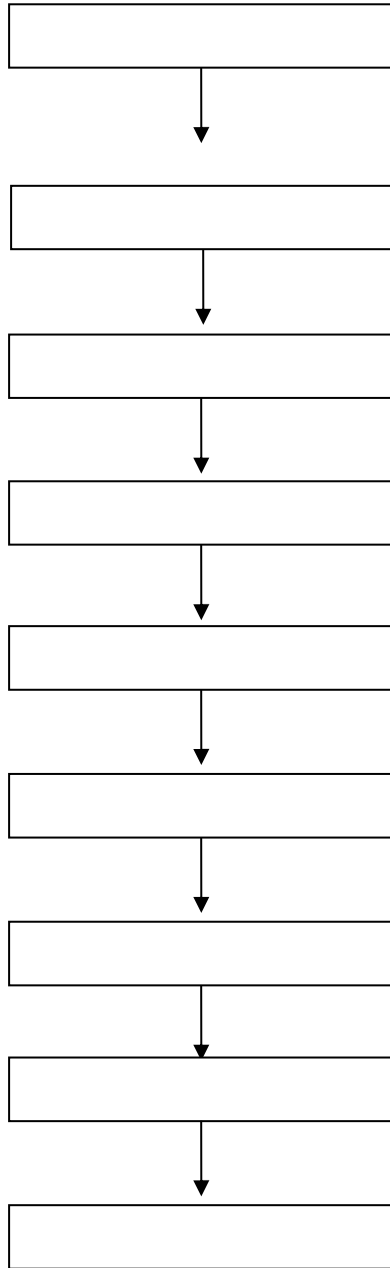
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60	SH/T 3004-2011	
61	GB/T 13869-2017	
62	GB 50217-2018	
63	GB 50052-2009	
64	GB 50054-2011	
65	HG/T 20549-1998	
66	1	GB 4053.1-2009
67	3	
GB4053.3-2009		
68	GB/T 50062-2008	
69	AQ3009-2007	
70	SH/T 3097-2017	
71	GB12158-2006	
72	HG/T20573-2012	
73	GB50395-2007	
74	GB50343-2012	
75	SH/T 3043-2014	
76	GB/T21447-2018	

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1 1



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1

9.3  
35.4  
-28.3  
24.5  
-11.1

2

4.6m/s  
25.7m/s

3

616.6mm  
142.2mm

4

150mm  
35.01kg/m<sup>2</sup>

5

26.9d

6

7

8

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220kV

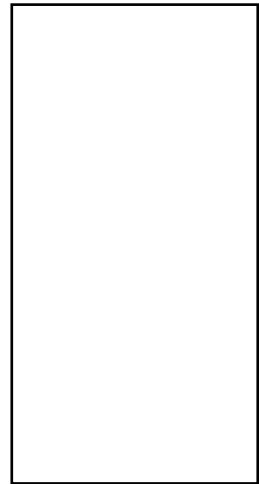
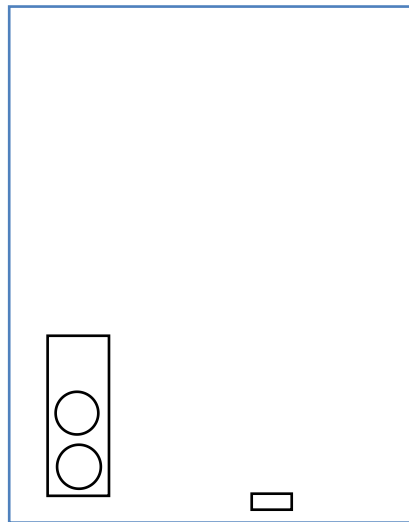
20m

2. 2-1

2. 2-2

2-1

2.2-1



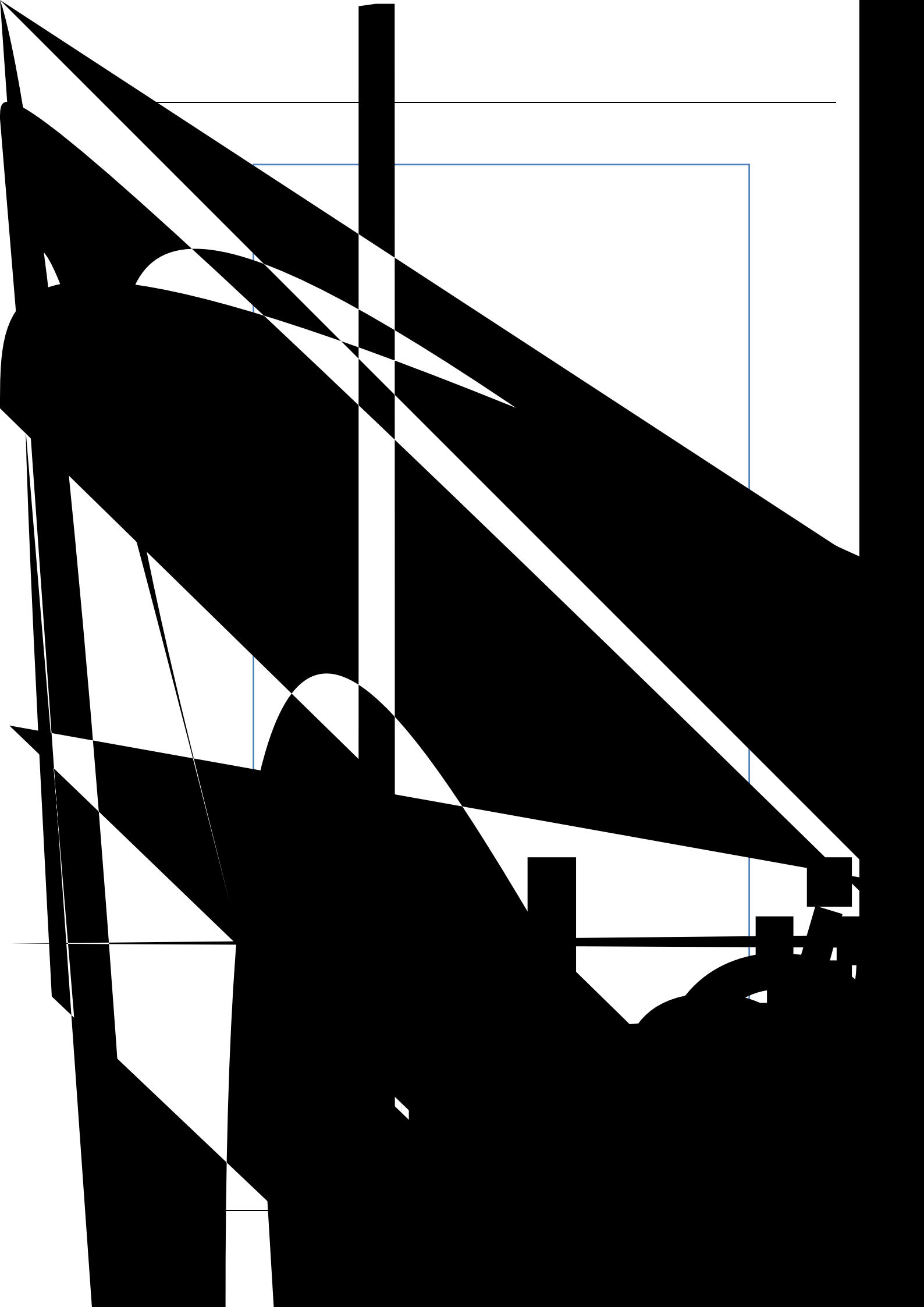
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2.2-1

10

58

GB50016-2014  
2018  
3.4.1



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2.3-1

	m	m	
1	10	56	GB50016-2014 2018 3.4.1
2	10	10	GB50016-2014 2018 3.4.1
3	10	12	GB50016-2014 2018 3.4.1
4	10	15	GB50016-2014 2018 3.4.1
5	10	22	GB50016-2014 2018 3.4.1
6	15	55	GB50016-2014 2018 4.2.1 4
7	10	22	GB50016-2014 2018 3.4.1
8	10	40	GB50016-2014 2018 3.4.1
9	15	51	GB50016-2014 2018

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50 1 4 4

19			5	9	GB50016-2014 2018 4.2.9	
20			15	16	GB50016-2014 2018 4.2.1 4	
21			4	4	GB50028-2006 2020 6.6.3 1	
22			12	14	GB50016-2014 2018 3.4.1	
23			12	24	GB50016-2014 2018 3.4.1	
24			12	20	GB50016-2014 2018 3.4.1	
25			12	12	GB50016-2014 2018 3.4.1	
26			25	44	GB16912-2008 3	

2.3-2

			m	m		
1	7960× 11000mm		0.5H=5.5	5.5	GB50016-2014 2018 4.2.5 3	
2		7960 × 11000mm	0.4D=3.192	12	GB50016-2014 2018 4.2.2	
3	7960×11000mm		0.5H=5.5	5.5	GB50016-2014 2018 4.2.5 3	
4		5000×5400mm	0.4D=3.192	12	GB50016-2014 2018 4.2.2	

---

2. 3-3

1	368.40	1202.52	12.45	3	2	2
2	298.59	96.32	5	1	1	1
3	475	312.5	9.8	2	2	3
4	367.2	367.2	9.8	2	2	3
5	1385.09	998.21	9.8	3	2	4
6	848.64	1382.16	14.3			

---

1		2.95t 7.5KW	1			
2		40L/	2	37MN		11
3		1.1kW 380V	1			
4			5			
5			2			
1	V0301	3320×9000 V=50m <sup>3</sup>	1	S30408	-180	0.8
2	V0303	2620×8390 V=30m <sup>3</sup>	1	16MnDR	-196	0.8
3	V0302A	3224×9300 V=50m <sup>3</sup>	1	16MnDR	-37	2.2
4	V0302B	2620×8390 V=30m <sup>3</sup>	1	16MnDR	-37	2.2
5	P0301	100 450L/h 5.5KW	1		-180	27 16.5



28			550kg/h	1	304	-40		
29			6	1	304	-44		
30			50kg/	50	37MN		15	
31			50kg/	50	37MN		15	
32			50kg/	50	37MN		15	
33			50kg/	50	37MN		15	
34			40L/	16	37MN		11	
1	F0401		YQ Y W1400 QT- YC	1		200	0.8	
1	P0801		159m /N	2		200	0.8	
2	P0802		159m /N	2		200	0.8	
3	P0803		80m /N	2		200	1.2	
4	V0801		500m <sup>3</sup> 7960×11000	1		200		
5	V0802		500m <sup>3</sup> 7960×11000	1		200		
6	V0803		100m <sup>3</sup> 5000×5400	1		200		
7	X0801		DN125	2	PPH	200	0.8	
8			1000*1500	1		200	8	
1			200m <sup>3</sup> /h	2			10-15kPa	0.1-0.4MPa
2			200t	1				

---

1

1203m<sup>3</sup>/a

DN150

80m<sup>3</sup>/h

2

1

2

3

4

2.5.8

486m<sup>3</sup>

432m<sup>3</sup>

16000m<sup>2</sup>

8.92mm

$V = 10qF = 10 \times 8.92 \times 1.6 = 142.72\text{m}^3$

2m<sup>3</sup>/d

V

$= 486 + 142.72 + 2 = 634.3\text{m}^3$

45m<sup>3</sup>

619.2m<sup>3</sup>

664.2m<sup>3</sup>

1

VA

BD8. 0/60-W

200L

2

1

90kW

90kW

UPS

3

4.5m

2

GB50058-2014

II CT1

Gb

IP65

4

UPS

90min

LED

LED

1

12

10m x 10m

12

m

---

100mm

3



---

1

2

PLC

3

UPS

90min

4

1

PLC

PLC

2

3

4

15.0MPa

14.5MPa

5

6

7

5

2.7-1

2.7-1



500m<sup>3</sup>

11m<sup>3</sup>/h

3

BD9.8/40-125-285 L

Q=45L/s

H=91m

XBC10/40-W150

H=91m

XBD8.8/2W-40DP

Q=1.6L/s

H=85m

0.96-1.0M

0.91MPa

4

60m



4

5

B

3

3%

5L/min·m<sup>2</sup>

30min V0801 V0802

V0803

1.64L/s

8L/s

PCL

0.432m<sup>3</sup>



0.03



4L/s

6.985m<sup>3</sup>

0.216m<sup>3</sup>

6

2		A	MF/ABC3	8	
		B	MP9	2	
		A	MT7	2	
3		C	MF/ABC8	14	
4		A	MF/ABC4	8	
5		A	MF/ABC4	16	
6		B	MF/ABC4	36	
7		B	MF/ABC4	9	

7

2km

5min

1

2

2.7-3

2.7-3

1

2

2

2

3

/

1

-

5

2

6

/

1

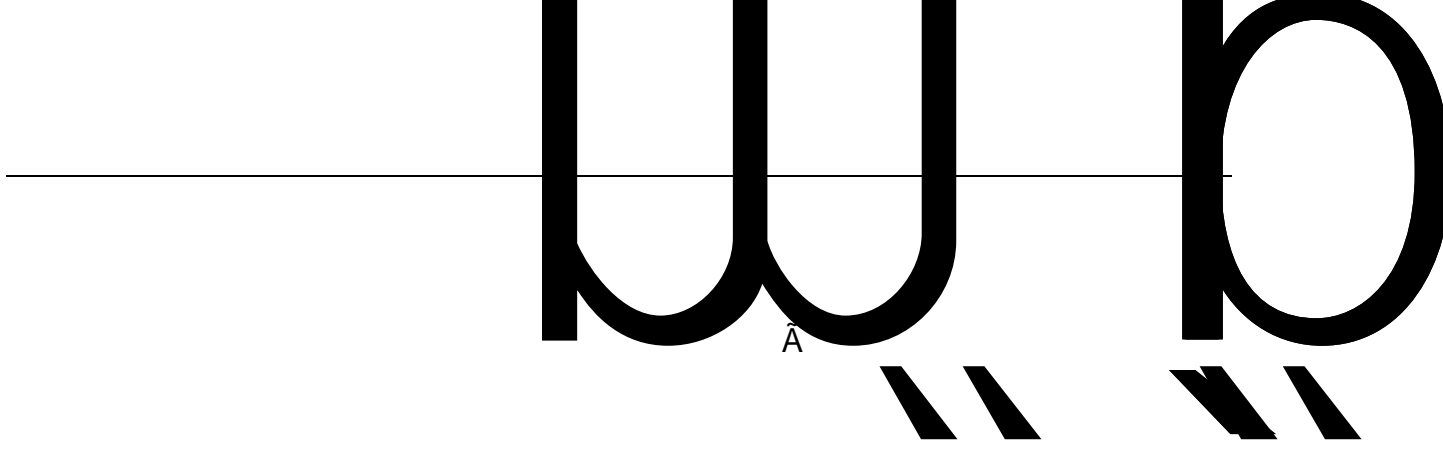
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7

4

8

1





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9.		1648	1049	1333-74-0	1	2.1		-	4.1-74.1	CT <sub>1</sub>	-	
1	2018											
2	2015											
3	2015 -											
4												
5												

---

C.0.1-1





	30
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C.0.1-3

carbon dioxide	CAS	124-38-9	
CO <sub>2</sub>	UN	1013	642
			2.2

-56.6

-78.5

=1 1.56

=1 1.53

[ ]

[ ]

[ ]

[ ]

~ ' m2 f

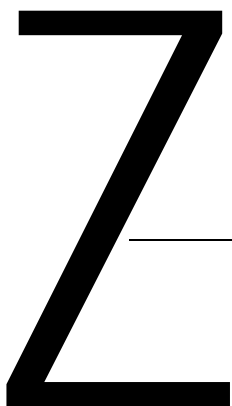
' m2 u

' m

x ' m

f ' m

]



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C.0.1-4

	Nitrogen N2	CAS UN	7727-37-9 1066	172 2.2
	99.999  -209.8 =1 kPa MPa		99.5  -195.6	98.5  =1 0.97 -147
	[ ]			18
	[ ]			
	[ ]		30	
	[ ]			
	[ ]			

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C.0.1-5

argon	CAS	7440-37-1	
Ar	UN	1006	2505
			2.2

-189.2  
 -185.7  
 =1 1.40 -186

=1 1.38

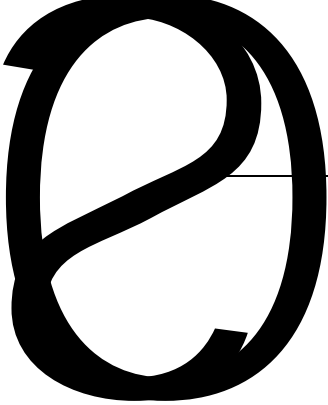
" "

[ ]  
 [ ]  
 [ ]  
 [ ]

75

50

[ ]  
 [ ]



C.0.1-6

CAS 7440-59-7  
UN 1046

helium  
He

1188

2.2

-272.1  
-268.9  
=1 0.15 -271

=1 0.14

[ ]  
[ ]  
[ ]  
[ ]

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[ ]

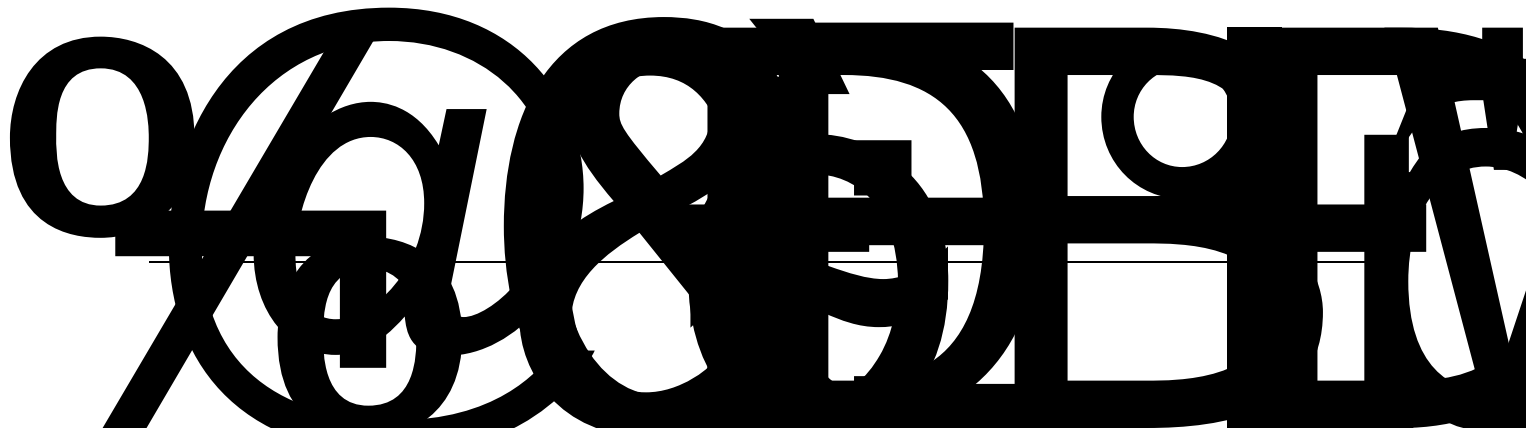
18

[ ]  
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p

p

Q



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217  
345  
=1 1.24

=1 1.53

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Q



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8 9

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6

2m

2m

p

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-28.3

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1

2

3

4

5

4.1-1

1		
2		
3		
4		
5		

4.2-1

4.2-1

1				

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2

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3

QRA

---

1

2

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

S

$q_1 \quad q_2 \dots q_n$

t

$Q_1 \quad Q_2 \dots Q_n$

t

1

GB18218

R

2 R

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

R-

$q_1$   $q_2$  ...  $q_n$   
 $Q_1$   $Q_2$  ...  $Q_n$   
 1 2... n  
 —  
 3

5. 1-1

5. 1-1

	J1	4
	J2	1
	J3	2
	J4	2
	J4	1
	W1.1	2
	W1.2	2
	W1.3	2
	W2	1.5
	W3	
	W4	1
	W5.1	1
	W5.2	1.5
	W5.3	1
	W5.4	1
	W6.1	1
	W6.2	1.5
	W7.1	1
	W7.2	1.5
	W8	1
	W9.1	1
	W9.2	1

	W10	1
	W11	1

4

500m

5. 1-2

5. 1-2

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

5

R 5. 1-3

5. 1-3

R

	R
	R 100
	50 R 100
	10 R 50
	R<10

50

36

1 Z#â

0 U 50m³

16



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1.

2.

3.

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10.

11.

d

18.				
19.				
20.				
21.				
22.				

22

1.		3.0.1		
2.		3.0.5		
3.		3.0.6		
4.		3.0.8		
5.		3.0.9		
6.		3.0.10		
7.		3.0.12		
8.	9 9	3.0.14	7	

- 
9.                    3.4.1                    3.4.1                    2.2-1
  10.                                       4.4.2
  - 11.

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5.5m

2.

2

3.1.7

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		3.0.15	
11.		6.0.8	
12.	4.0m	7.0.2	8m
	3.5m		
13.		7.0.6	
14.			

2.		6.2.22		
3.		6.2.23		
4.		6.2.25		
5.		5.3.7		
6.		5.4.4		
7.	700mm~1500mm	5.4.6	1300mm	
8.		5.4.11		
9.		4.6.2		
10.		5.1.4		
11.	GB/T 4272	5.2.2	GB/T 4272	
12.		5.6.1		
13.		5.6.3		
14.		5.6.5	2	
15.	GB/T 2893.5	6.1.1		

16.		6.1.2		
17.		6.1.4		
18.		4.0.18		
19.		4.0.21		
20.	1 2 3 4	4.0.23		
21.		4.0.24		
22.		6.0.5		
23.		6.0.11		
24.		6.0.16		
25.		8.0.5		
26.		8.0.7		
27.	10	8.0.8	10	
28.		8.0.10		
29.		11.0.2		

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30.

4m

11.0.4

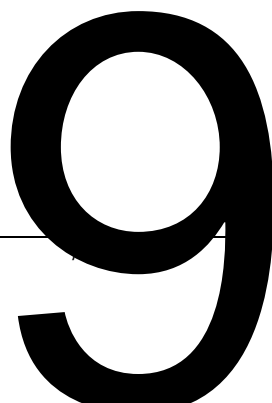
4.5m

31.

		4.1.6		
43.	1.5m~2.0m	6.1.3	1.5m	
44.		1 4.5.2		
45.	1.2m	3 4.1.1		
46.		3 4.1.2		
47.	2m 900mm 2m 20m 1050mm 20m 1200mm	3 5.2		
48.	100mm 10mm	3 5.6.1	100mm 10mm	
49.	750mm 450mm	3 6.1.1	750mm	
50.	1 2 3	9.1.1		

	4			
	5			
51.	1			
	2			
	3			
	4	9.1.3		
	5			
52.		9.2.1.3		
53.		9.2.2.2		

54.		7.1.1.4	PLC	
55.	2m	7.3.2.1		
56.		7.3.3.1		
57.	2m	7.3.3.2		
58.		7.3.3.3		
59.		7.3.5.3		
60.		11.5.1	2	
61.	10s 15m	11.5.2		



2.		5.3.1		
3.	40C 2	1 7.3.1		
4.	200mm 30m 2m	7.3.2		
5.		4.1.9		
6.		3.1.10		
7.		3.1.12		
8.		9.1.6		
9.		5.1.1		
10.		5.2.3	CT1	
11.		5.4.3 2		
12.		5.4.3 6		
13.		6.1.1		
14.				

---

5.5.3

15. 5.1.9

16. 4.1.1

17. 4.1.2

Ø12  
,

18. B 4.3.1

12 m × 8 m      10 m × 10 m

5

18. vó





		6.1.4		
45.		8.12.1		
46.		3.1.2		
47.	1.3m-1.5m	6.3.2		
48.		3.0.1		
49.		3.0.2		
50.		3.0.3	24h	
51.		3.0.4		
52.		3.0.6		
53.		3.0.8		
54.				



		10m	4.2.1		
	4m				
55.	IP65		6.1.4		IP65
56.		IP65	7.4.3	IP65	
57.			8.5.3		
	150mm				
58.	120m		8.5.6	120m	
59.		60m	8.5.7	60m	
60.					



	4			
64.		12.0.13		
65.		12.0.14		
66.		12.0.15		
67.	1 1.3m 1.5m  2 3 150mm		1.3m	
68.	30m	6.3.1		
69.		5.1.14		
70.		5.1.16		
71.		6.6.3		
72.		6.6.4		
73.		9.2		

---

74.

9.5

75.

(, m

7.

(, m

7

---

3        "        "

---

10

11

12

Exd CT<sub>1</sub>

13

0

14

15

, m'  
m



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5. 2-13

215

6

209

"

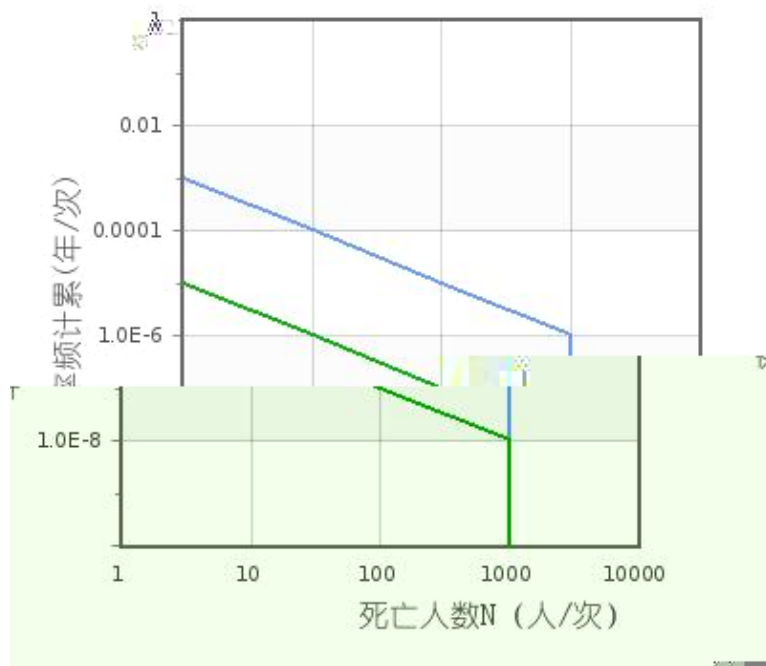
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GB36894-2018

5. 4-1

	$3 \times 10^{-7}$	$3 \times 10^{-6}$
	$3 \times 10^{-6}$	$1 \times 10^{-5}$
	$1 \times 10^{-5}$	$3 \times 10^{-5}$



1

GB 36894-2018

5.4-2 /

	1.00E-05	
	3.00E-06	
	3.00E-07	

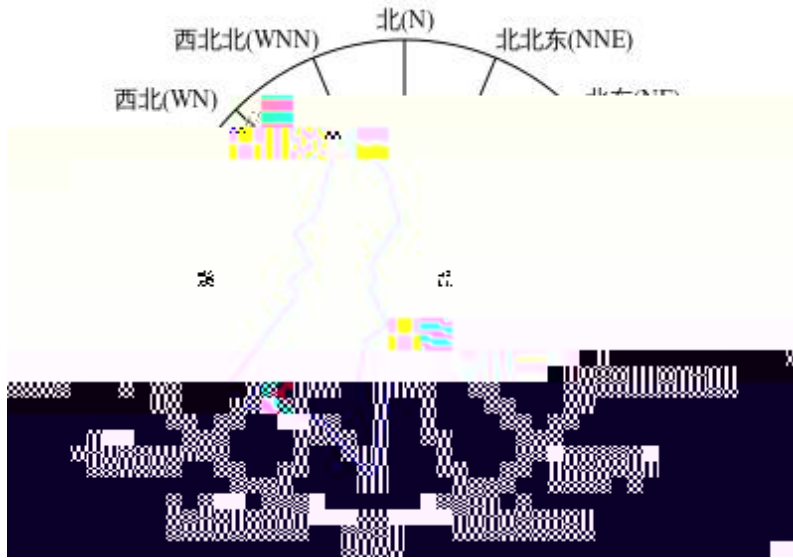
2

C

pa

101325

m/s	4.6
kg/m	1.293
K	298
	0.03

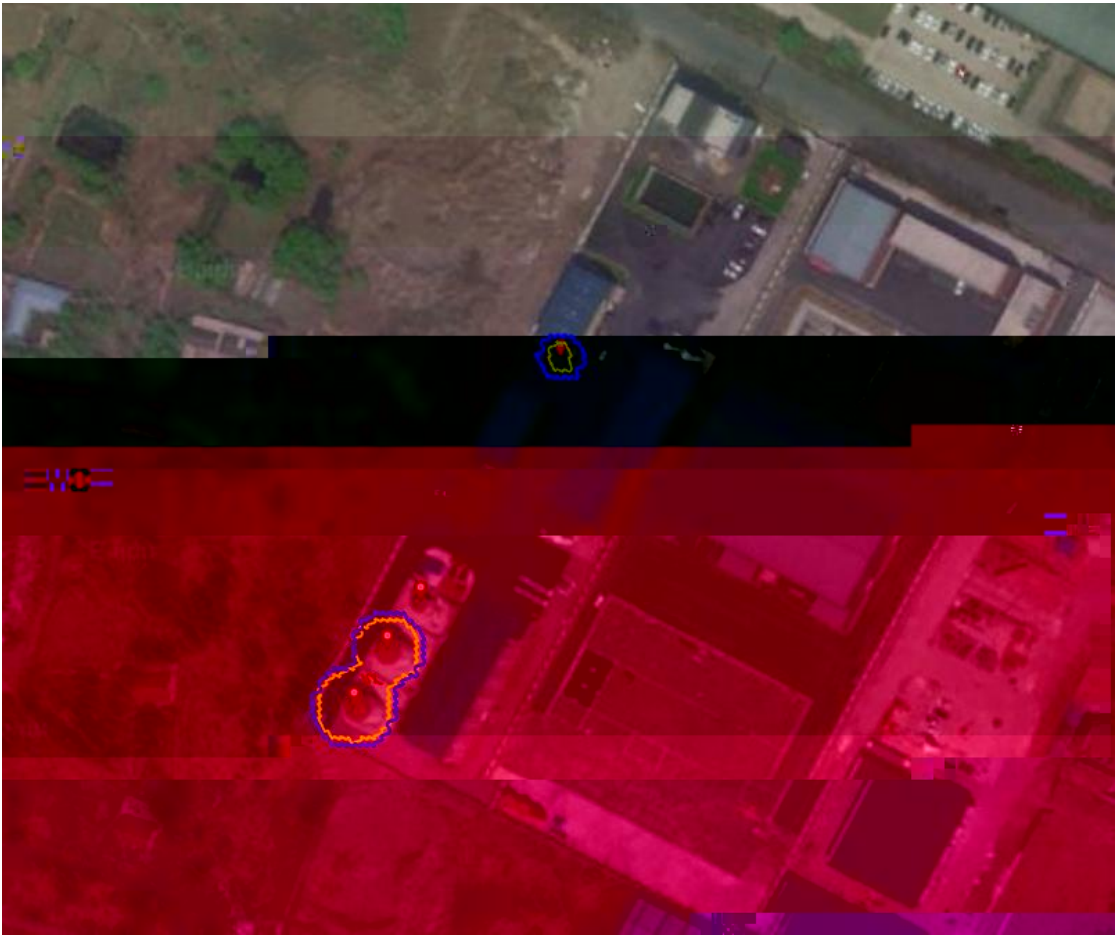


5.4-2

3

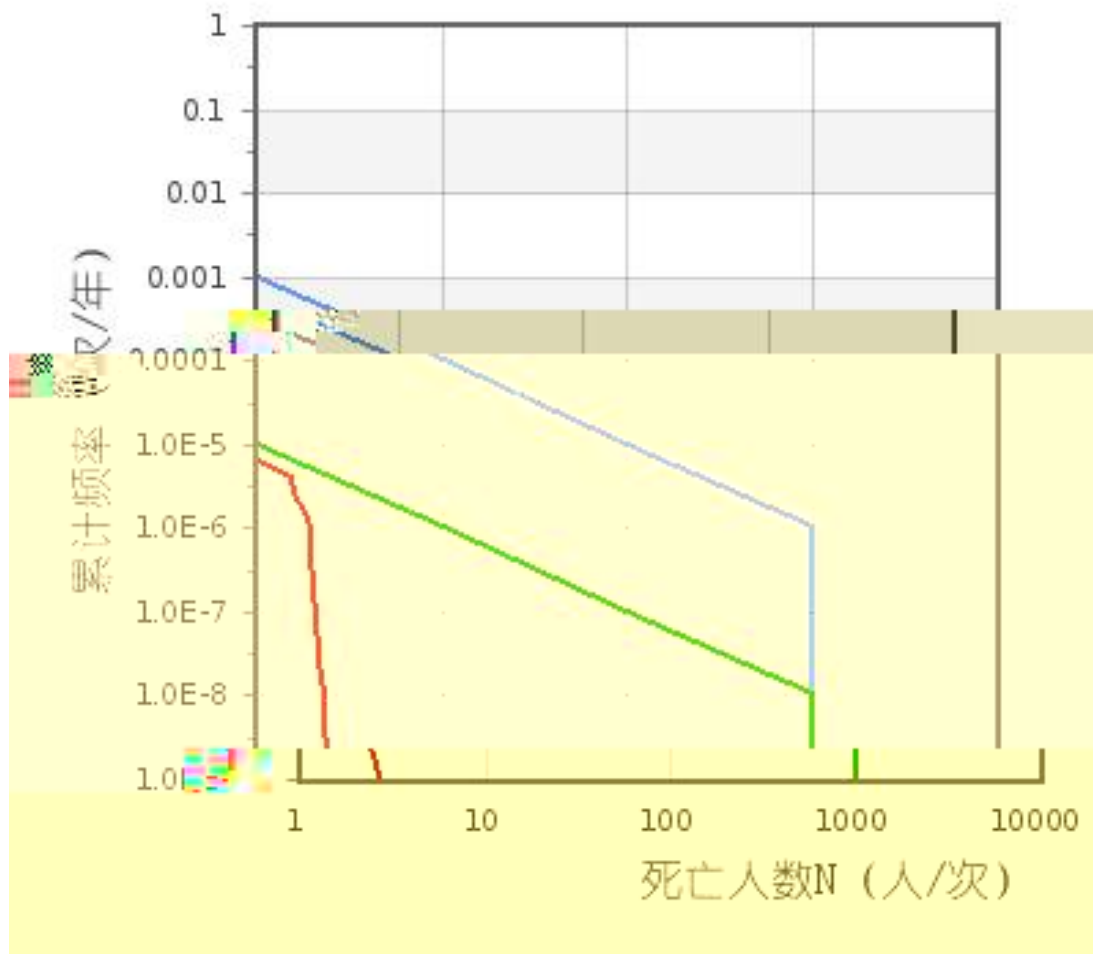
100%

/



5.4-3

标准名称：中国：《GB36894-2018》



(PLL) 1.86183E-5

5

1



m

m 12.6m

m 14.15m

56m

2



1



m

11.3838

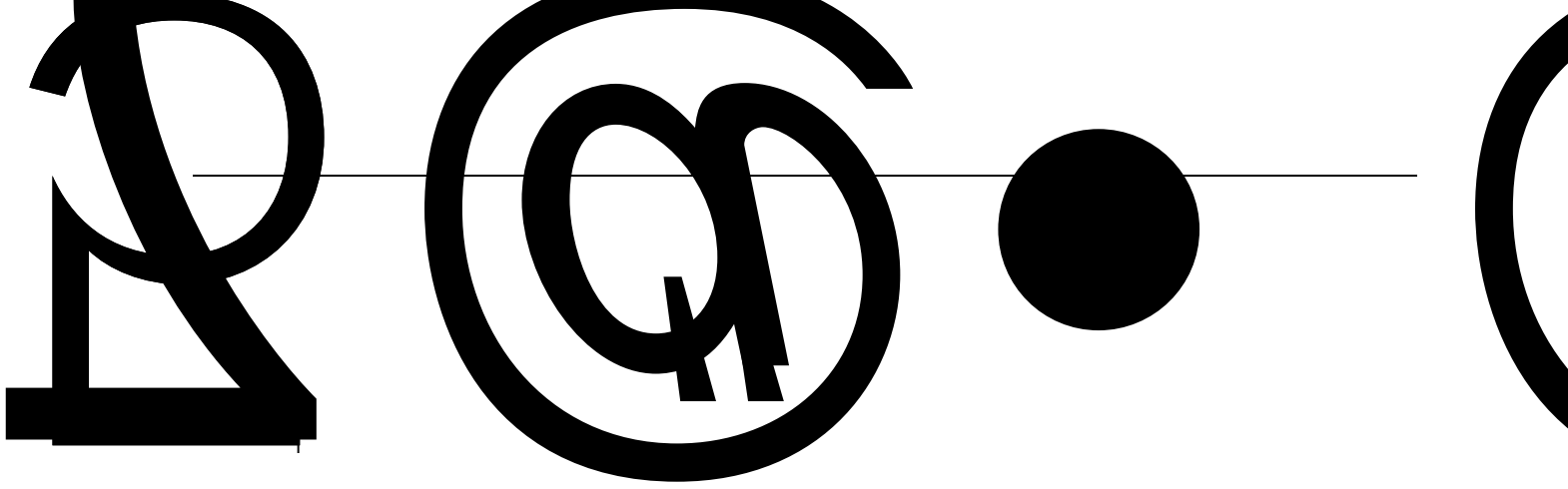
11.3838

0

11.380

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				m
				0



" "

2  
3  
5

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5

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2011 93

4.3

7

GB30871-2022

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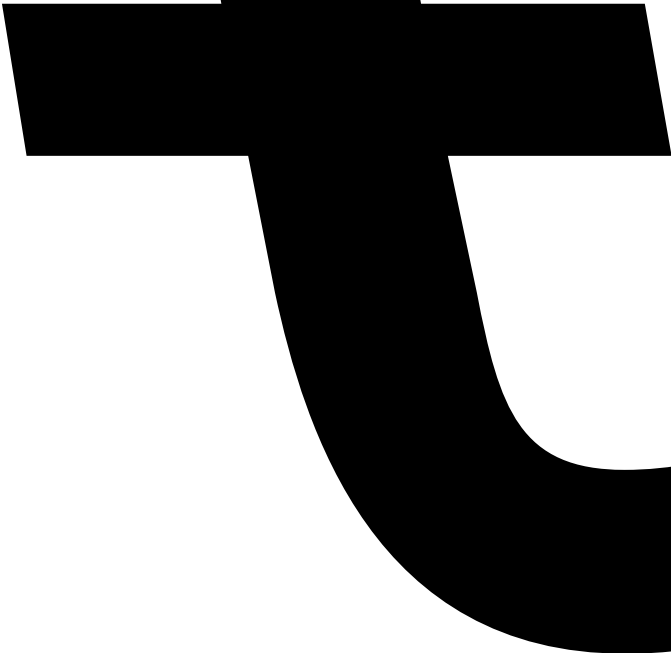
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