



กรมโรงงานอุตสาหกรรม
DEPARTMENT OF INDUSTRIAL WORKS

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10400

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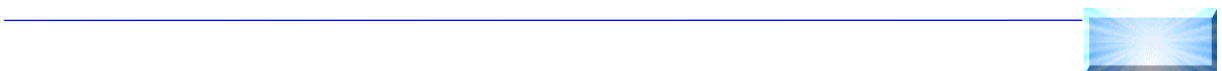
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10400







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« ภาศที่ 1 »

1.1

1.2

1.3

1.4

1.5

1.6

1.7

1.8

1.9 Flashover

1.10 Backdraft

1.11

1.12



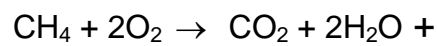
1

1.1

(Oxidation)

นิยามของปฏิกิริยาออกซิเดชัน คือ ปฏิกิริยาทางเคมีที่เกิดระหว่างสารใดๆ กับออกซิเจน และทำให้เกิดมี ความร้อนเกิดขึ้น และความร้อนที่เกิดจากกระบวนการเผาไหม้นี้ จะเป็นแหล่งความร้อนซึ่งเป็นปัจจัยสำคัญ ที่ทำให้การลุกไหม้ของไฟดำเนินไปอย่างต่อเนื่อง

ตัวอย่างของปฏิกิริยาการเผาไหม้ที่มีมีเทน (CH₄) เป็นเชื้อเพลิง



(Mid-Range Reaction)

(Corrosion)

1.2

3

- 1.
- 2.
- 3.

(Chain Reaction)
(Fire Tetrahedron Theory)
3

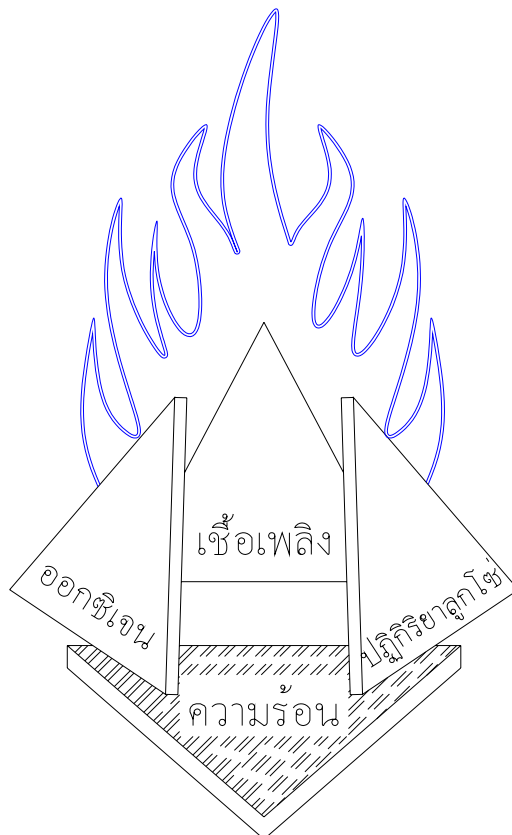
1.2.1

(C)

(H)

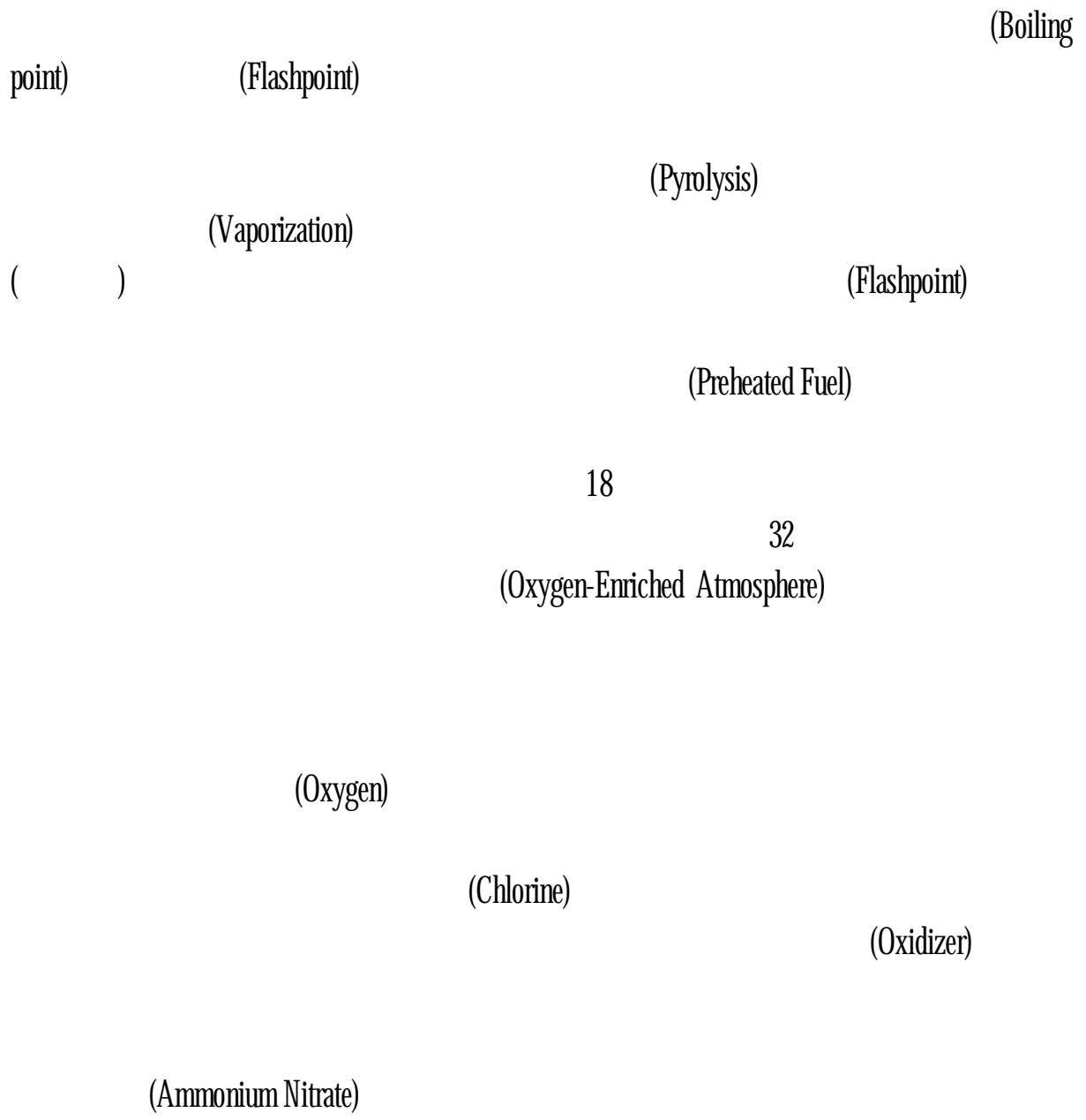
(Chain Reaction)

(Fire Tetrahedron)



1.2.1

(Fire Tetrahedron)



1.3

1. (Class A)

2. (Class B)

(Combustible Liquid)

(Flammable Liquid)

(Fluid)

3. (Class C)

4 (Class D)

(Magnesium)

(Titanium)

(Zirconium)

1.4

4

1.

2

3

4

(Fusion)

(Fission)

1.5

1.

2

1.1

1.2

(Gas Law)

2

4

2.1

(Conductor)

22

23

2

24

3

4

31

32

4

(Uranium)
(Fission)

(Plutonium)

2

(Fusion)

1.6

1. (Flashpoint)

Sustained Combustion)

(Self-

2 (Ignition Temperature Fire Point)

3 (Auto-Ignition Temperature)

4 (Flammable Range or Explosion Range)

(Flammable Vapour)

(Flammable Gas)

(Upper Flammable Limit)

(Lower Flammable Limit)

Upper Explosive Limit (UEL)

Lower

Explosive Limit (LEL)

(LFL) 1.5
7.5

(UFL)
1.5 7.5

1

10

5

(Flame Spread)

(Smoke Production)

2

1. (Flexible Solid)

2. (Structural Solid)

3

51

52

53

1.7

1. (Vapor Pressure)

(Atmospheric Pressure)

	(mmHg)	(psi)	(Atmospheres (atm))
		760	
	38		(Kerosene) 5
21		(Toluene) 20	
		(Ethyl Acetate) 73	20

2

(Vapor Density)

1

1

1

1

1

(Flammable Liquid Vapor)

(Flammable Gas)

(Acetylene)

1.6

0.907

3

(Specific Gravity)

1

1

1

4

(Solubility)

1

(Isopropyl Alcohol)

1

1.8

4

- 1.
2. (Convection)
3. (Radiation)
4. (Conduction)

1.

(Incipient Stage)

2

(Convection)

(Developed Stages)

()

3

(Radiation)

()

4

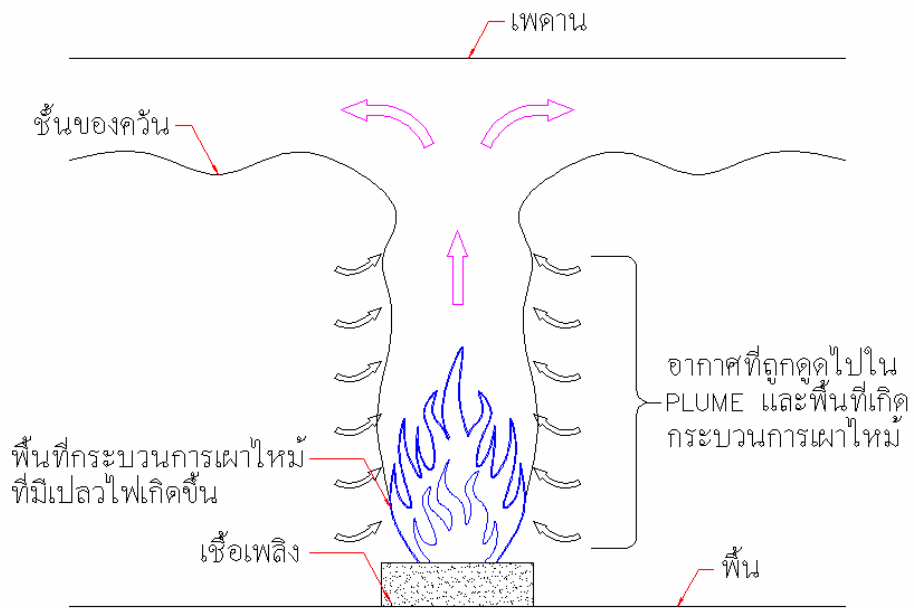
(Conduction)

1.9

Flashover

Flashover

(Enclosed Space)



1.9.1

1.10 Backdraft

Back Draft (Smoke Explosion)

(CO)

2

Backdraft

1.11

4

1.

2

3

4

41 (Carbon Dioxide, CO₂)

42 (Carbon Monoxide, CO)

Cyanide, HCN)
Dioxide, NO₂)

(Sulfer Dioxide, SO₂)

(Hydrogen
(Nitrogen

2

1.12

4

1.

(Flashpoint)

2

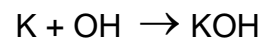
2

3

4

Affinity)

(Highly



1

2

1

« ភាគី 2 »

21

22

23



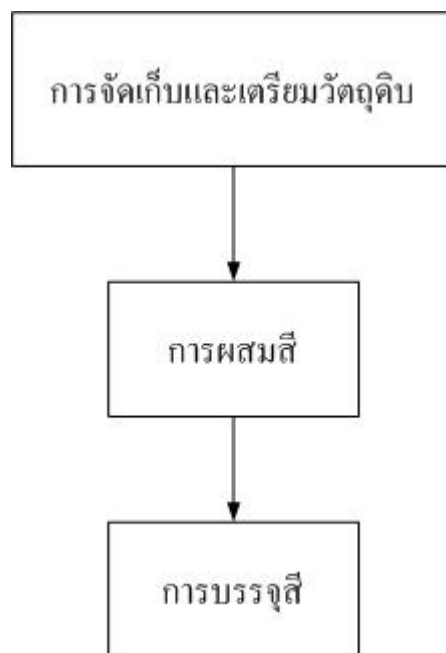
2

21

2

(2.1.1)

1.



2.1.1

1.		<p>_____</p> <p>1. 1</p> <p>(Safety Container)</p> <p>2.</p> <p>3.</p> <p>4.</p> <p>_____</p> <p>1.</p> <p>2</p> <p>3.</p> <p>4</p> <p>5.</p> <p>1</p>	<p>_____</p> <p>: -1</p> <p>: 2A:10B-C</p> <p>: 9</p> <p>(4)</p> <p>_____</p> <p>:</p> <p>1</p> <p>2.5</p> <p>: 45</p> <p>_____ (</p> <p>_____)</p> <p>:</p> <p>:</p> <p>(</p> <p>4)</p> <p>_____ (</p> <p>_____)</p> <p>:</p> <p>(</p> <p>4)</p> <p>_____</p> <p>:</p> <p>(4)</p>

		<p>6.</p> <p>_____</p> <p>NFPA 51B, 69, 70, 77, 230</p>	<p>_____ (_____</p> <p>_____)</p> <p>_____ :</p> <p>(_____ 4)</p> <p>_____ :</p> <p>(_____ 5)</p> <p>_____ (_____</p> <p>_____)</p> <p>_____ :</p> <p>(_____ 6)</p> <p>_____ (_____</p> <p>_____)</p> <p>_____ :</p> <p>(_____ 6)</p>
2		<p>_____</p> <p>1. _____ 25</p> <p>2.</p> <p>3.</p>	<p>_____ -1</p> <p>_____ :</p> <p>_____ : 2A:10B-C</p> <p>_____ : 9</p> <p>(_____ 4)</p> <p>_____ :</p>

		<p>4</p> <p>5.</p> <p>6.</p> <hr/> <p>1.</p> <p>2.</p> <p>3.</p> <p>4</p> <p>5.</p> <p>1</p> <hr/> <p>NFPA 30, 51B, 69, 70, 77</p>	<p>1 2.5</p> <p>: 45</p> <p>(4)</p> <hr/> <p>:</p> <p>:</p> <p>(4)</p> <hr/> <p>:</p> <p>(5)</p> <hr/> <p>:</p> <p>(6)</p> <hr/> <p>:</p> <p>(6)</p>
3.		<hr/> <p>1.</p> <p>25</p>	<hr/> <p>: -1</p> <p>: 2A:10B-C</p>

		2.	: 9 (4)
		3.	: 1 2.5
		4.	: 45 (4)
		5.	:
		6.	:
			(4)
		1.	:
		2.	(4)
			:
		3.	(5)
		4.	:
			(6)
		NFPA 30, 51B, 69, 70, 77	(6)
			:
			(6)

NFPA 51B Standard for Fire Prevention During Welding, Cutting, and Other Hot Work 2003 Edition
NFPA 69 Standard on Explosion Prevention Systems 2002 Edition
NFPA 70 National Electrical Code® 2005 Edition
NFPA 77 Recommended Practice on Static Electricity 2000 Edition
NFPA 230 Standard for the Fire Protection of Storage 2003 Edition

/ : / :
 : :

1.			
1.1			
-			
-			
-			
-			
-			
1.2			
-			
-			
-			
-			
-			
-			
1.3 (6)			
-			
-			
1.4 (6)			
-			
-			
- (Hot Work Permit)			
2			
2.1			
-			
-			
- 1			
2.2 (6)			
-			
-			
-			





31 (Fire Seal)

1.

- 1.
- 2.

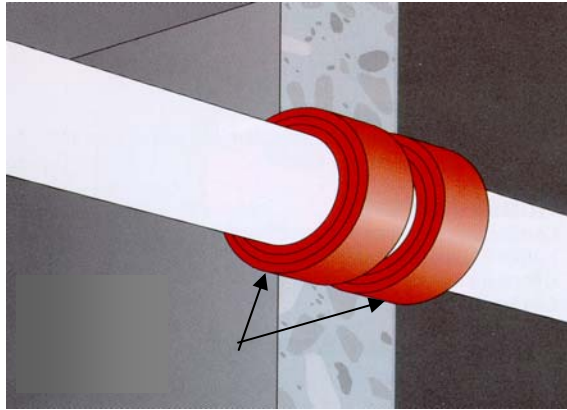
	(Firestop Device)	(Firestop System)	ASTM
	E-814, Fire Tests of Through-Penetration Fire Stops	ANSI/UL 1479, Fire Test of Through	
	Penetration Fire Stops	2.5	(0.01
)		

	(Mortar)	2
1.	150	(6)
0.09		
2.		

2

2

2



3.1.1

UL 555S, Standard for Safety

Leakage Rated Dampers for Use in Smoke Control Systems

(Fire/Smoke Damper)

UL 555, Standard for Fire Dampers

UL 555S, Standard for Safety Leakage

Rated Dampers for Use in Smoke Control Systems

3

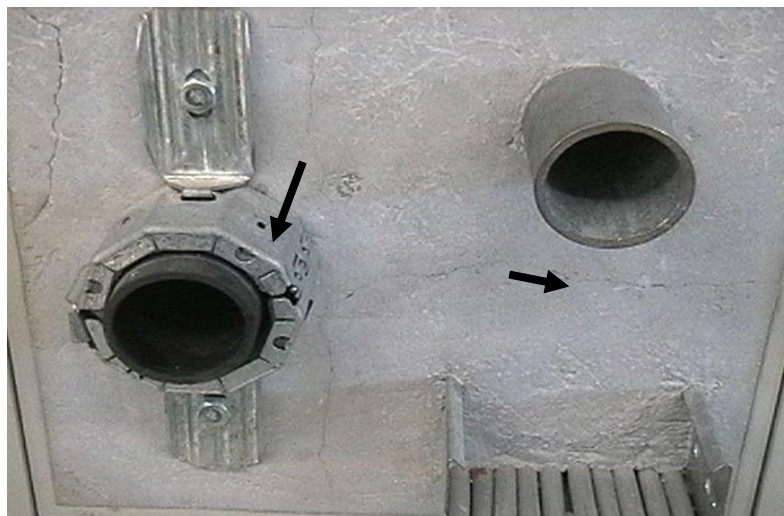
2

1.

Polyvinyl Chloride (PVC)

Polyethylene (PE)

3.1.2



3.1.2

32	(Fire Compartment)
-----------	---------------------------

1.

(Fire Resistance Gypsum Board)

3.2.1

			()
1	$\frac{1}{2}$	15-20	60
2		15-20	120
3	140	15-20	120
4	190	15-20	180
	())	

3.2.2

	()
	2
12 ()	1

BS 476, Fire Tests on Building Materials and Structures

750

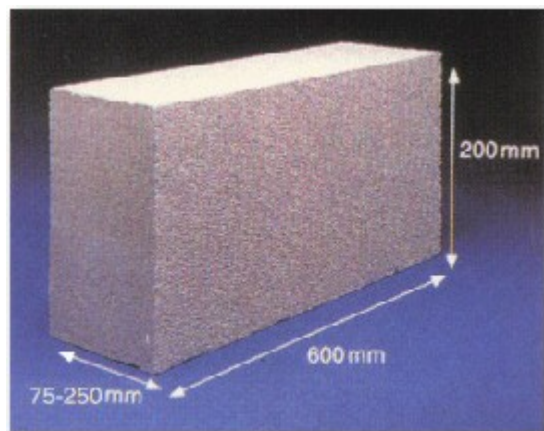
2

1,100

4

60

3.2.1

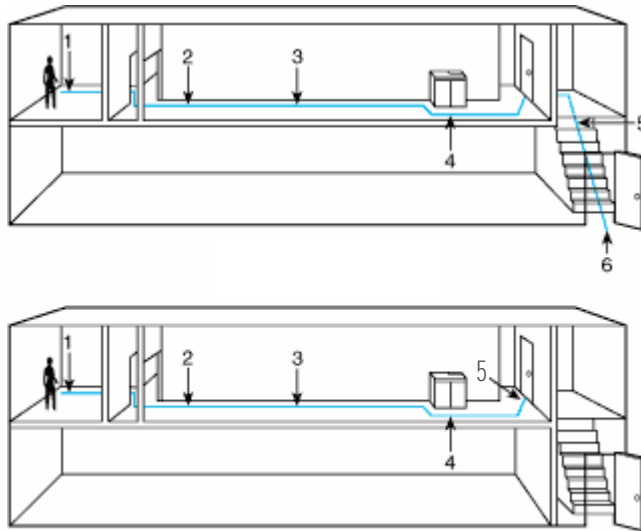


3.2.1

1.

300

3.3.1



3.3.1

1-2-3-4-5-6

1-2-3-4-5

3.3.1

3.3.1

	()	
	45	76

	()	
	45	76
	60	91
	60	91
	60	75
	91	122
	0	23
	60	122
	23	30

- 1. 3.3.1 2
- 2. 3
 - 2.1
 - 2.2
 - 2.3
- 3. 3
 - 3.1

3.2

3.3

2

2

60

500

1,000

3

1,000

4

1.

108 (10 -)

2.

10.8 (110 -)

3.

2.2 (0.2 -)

1½

10.8

(1 -)

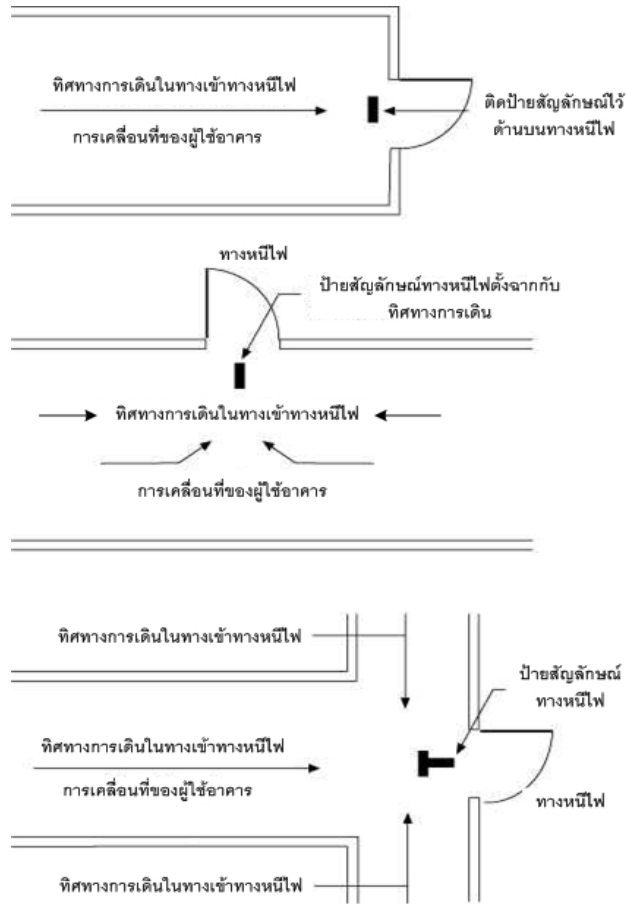
1.1 (0.1 -)

1½

6.5 (0.6 -)

6.5

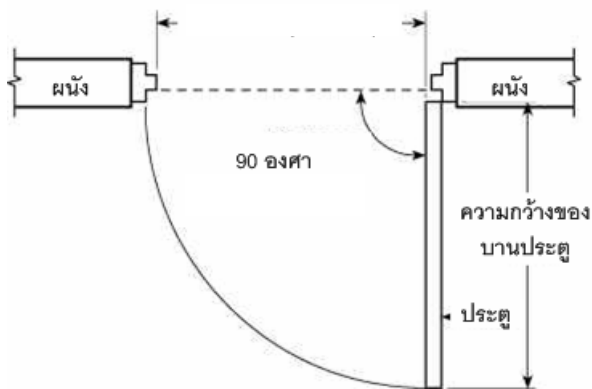
(0.6 -)



3.3.2

30 (100)

3



3.3.3

3.3.2

	()		()	
	10	0.4	5	0.2
()	7.6	0.3	5	0.2
()	15	0.6	13	0.5
	18	0.7	10	0.4
	7.6	0.3	5	0.2

915

34

1. ASTM E119, Standard Test Method for Fire Tests of Building Construction and Materials
- BS 476, Fire Tests on Building Materials and Structures

2.

3.

3.4.1

3.41

		()
1.		
1.1	300	40
1.2		40
	300	
1.3		40
		300
1.4	115	20
2		
2.1		35
2.2		
1.	200	115
2.	300	65
3.	200	50
4.	300	45
2.3		40
		115
2.4		115
1.		40
2.		20
3		
3.1	150x 150	50
3.2	200x 200	40
3.3	300x 300	25
3.4		50



3

3

4



