Test Report No. 7191203965-MEC19/01-RAH
dated 15 Mar 2019

Note: This report is issued subject to the Testing and Certification Regulations of the TÜV SÜD Group and the General Terms and Conditions of Business of TÜV SÜD PSB Pte Ltd. In addition, this report is governed by the terms set out within this report.

PSB Singapore

Add value.
Inspire trust.

SUBJECT

Testing of portable fire extinguisher submitted by Asiatic Fire System Pte Ltd.

TESTED FOR

Asiatic Fire System Pte Ltd
65 Joo Koon Circle
Singapore 629078

PERIOD OF TEST

01-Oct-2018 to 15-Mar-2019

METHOD OF TEST

SS EN 3-7:2012 - “Characteristics, performance requirements and test methods”

SS EN 3-8:2012 – “Additional requirements to SS EN 3-7 for the construction, resistance to pressure and mechanical tests for extinguishers with maximum allowable pressure equal to or lower than 30bar, - Prototype testing

IDENTIFICATION OF EXTINGUISHER

Type	: “KILLFIRE” brand, model “KW-9EN”
Maufacturer	: Asiatic Fire System Pte Ltd
Fire extinguisher medium	: Water
Nominal charge of extinguisher	: 9 Litre
Method of pressure storing	: Stored pressure type

The test was conducted at TÜV SÜD PSB’s fire laboratory located at No. 10, Tuas Avenue 10, Singapore 639134 except for clause 14.1 of SS EN 3-7 and clause 6.3.3 of SS EN 3-8 which was conducted at No.1 Science Park Drive, Singapore 118221.

CONCLUSION OF TEST

Conformity of submitted samples with all applicable clauses of SS EN 3-7 and SS EN 3-8 (yes/no)	Yes
Operation temperature range	5°C to 60°C
Checked working pressure	T_{min} 11.3 bar / T_{max} 13.8 bar
Dielectric suitability (applicable only for water based extinguisher)	No
Fire Class(es) intended for	A
Fire ratings achieved	13A

SUPPLEMENTARY INFORMATION

Quantity of samples provided	32 pieces
Date of submission	28-Sep-2018 and 13-Feb-2019

CONFORMITY OF INFORMATION

The extinguisher submitted can be identified from the detailed documentation supplied by the manufacturer comprising:

Annex 1 : Photograph of fire extinguisher label as submitted
Annex 2 : List of document non-included in this report
Annex 3 : Photograh of submitted samples (1 no. of photo)

REPORT

This report comprises 21 pages, including 3 annexes
Only material detailed in this report have been subjected to tests
The summary and checks and tests are given on page 3 to 4
This report or any part of it may not be reproduced without the written permission of the laboratory

Rafiq
Engineer

Tan Kim Heng
Assisant Vice President
(Fire Property)
Mechanical

This is a laboratory test report and not a product certification approval

SUMMARY OF CHECK AND TESTS

Item	SS EN 3-7 clause	Description	Applicable (Yes/No)	Conformity (Yes/No)
0a	3.2	Total weight of fire extinguisher	Yes	Yes
0b	3.15	Pressure at operating temperature, PT_{max} / PT_{min}	Yes	Yes
1	4.2	Control of discharge	Yes	Yes
2	4.3	Operating position	Yes	Yes
3	4.4	Hose assembly	Yes	Yes
4	4.5	Propellent	Yes	Yes
5	4.6	Means of checking pressure for stored pressure extinguisher	Yes	Yes
6	6.1	Nominal charge	Yes	Yes
7	6.2	Filling tolerance	Yes	Yes
8	6.3	Design of filling opening, except CO_2 fire extinguishers	Yes	Yes
9	7.1.1	Duration of operation , minimum charge	Yes	Yes
10	7.1.2	Duration of operation, spread of measurement	Yes	Yes
11	7.2	Residue charge	Yes	Yes
12	7.3	Commencement of charge	Yes	Yes
13	7.4	Temperature cycling	Yes	Yes
14	8.1	Retention of propellant	Yes	Yes
15	8.2	Leakage acceptance level	Yes	Yes
16	9.2	Dielectric test for water based fire extinguishers	No	-
17	10.1	General requirement for use of extinguishers	Yes	Yes
18a	10.2	Operating force for CO_2 extinguishers	No	-
18b	10.2	Operating force for other extinguishers- 1st device	Yes	Yes
18c	10.2	Operating force for other extinguishers- 2nd device	No	-
19	10.3	Safety devices	Yes	Yes
20	10.4	Filter for water based extinguishers	Yes	Yes
21a	10.5	Hose and coupling systems,for CO_2 extinguishers	No	-
21b	10.5	Hose and coupling systems,for other extinguishers	Yes	Yes
22a	10.6	Control valve, for CO_2 extinguishers	No	-
22b	10.6	Control valve, for 1 and 2kg powder extinguishers	No	-
22c	10.6	Control valve, for other extinguishers	Yes	Yes

SUMMARY OF CHECK AND TESTS (continued)

Item	SS EN 3-7 clause	Description	Applicable (Yes/No)	Conformity (Yes/No)
23	11.1.1	Pressure gauge	Yes	Yes
24	11.1.2	Pressure gauge scale	Yes	Yes
25	11.1.3	Pressure gauge error after cycling	Yes	Yes
26	11.1.4	Compatibility of pressure gauge materials	Yes	Yes
27	11.2	Pressure indicator	No	-
28	12.1	Hose / Horn for CO_2 extinguishers	No	-
29	12.2	Horn resistance to static load	No	-
30	12.3	Security of horn / hose fixing	No	-
31	12.4	Horn resistance to temperature	No	-
32	13	Mounting bracket	Yes	Yes
33	14.1	Resistance to external corrosion	Yes	Yes
34	14.2	Resistance to internal corrosion	Yes	Yes
35	15.2	Class A fire rating	Yes	Yes
36	15.3	Class B fire rating	No	-
37	15.3	Class B polar solvent	No	-
38	15.4	Class F fire rating	No	-
39	16.1	Extinguisher indentification, color	Yes	Yes
40	16.2	Marking	Yes	Yes

Item	SS EN 3-8 clause	Description	Applicable (Yes/No)	Conformity (Yes/No)
41	6.3.2	Burst test under pressure	Yes	Yes
42	6.3.3	Mechanical strength crushing test	Yes	Yes
43	6.3.4	Pressure test, bodies fitting and assemblies	Yes	Yes
44	6.3.5	Pressure test – pressure gauge and pressure indicators	Yes	Yes
45	6.3.6	Macroscopic examination of the body	Yes	Yes
46	6.4	Overfilled pressure test	No	-
47	6.5	Resistance to impact	Yes	Yes
48	9.2	Marking on body	Yes	Yes
49	9.3	Marking on extinguisher	Yes	Yes

0a. Total weight of fire extinguisher (EN 3-7:2004+A1:2007,clause 3.2)

Actual weight	(kg)	14.1
Required weight	(kg)	≤ 20
Conformity to clause 3.2 (yes/no) : Yes		

0b. Pressure at operating temperature, PT_{max} / PT_{min} (EN 3-7:2004+A1:2007,clause 3.15)

Declared operating temperature	(°C)	5 to 60	
Declared by manufacturer PT_{max}	(bar)	14	-
Test temperature	(°C)	T_{max}	T_{min}
		60	5
Measured pressure	(bar)	13.8	11.3
Conformity to clause 3.15 (yes/no) : Yes			

1. Control of discharge (EN 3-7:2004+A1:2007,clause 4.2)

Provision of device to interrupt discharge	(yes/no)	Yes
Self closing device	(yes/no)	Yes
Conformity to clause 4.2 (yes/no) : Yes		

2. Operating position (EN 3-7:2004+A1:2007,clause 4.3)

Operation without inversion	(yes/no)	Yes
Operating device location conform to requirements	(yes/no)	Yes
Conformity to clause 4.3 (yes/no) : Yes		

3. Hose assembly (EN 3-7:2004+A1:2007,clause 4.4)

Nominal charge	(l)	9
Requirement for hose	(yes/no)	Yes
Length of actual flexible hose fitted (≥ 400 / ≥ 250)	(mm)	550
Conformity to clause 4.4 (yes/no) : Yes		

4. Propellants (EN 3-7:2004+A1:2007,clause 4.5)

Type of propellant (to be checked by documentation)		Nitrogen
Tracer for leakage detection	(yes /no)	No
Conformity to clause 4.5 (yes/no) : Yes		

5. Means of checking pressure for stored pressure extinguishers
(EN 3-7:2004+A1:2007,clause 4.6)

Means for checking the pressure available	(yes/no/not applicable)	Yes
Type of pressure check	(pressure gauge/indicator/connection)	Pressure gauge
Conformity to clause 4.6 (yes/no) : Yes		

6. Nominal charges (EN 3-7:2004+A1:2007,clause 6.1)

Actual nominal charge of the extinguisher	(l)	9
Conformity to clause 6.1 (yes/no) : Yes		

7. Filling tolerances (EN 3-7:2004+A1:2007, clause 6.2)

Sample		1	2	3	4
Measured charge	(kg)	8.98	8.99	8.99	8.78
Deviation from nominal	(%)	-0.3	-0.2	-0.1	-0.3
Maximum allowable tolerance	(%)	+0, - 5			
Conformity to clause 6.2 (yes/no): Yes					

8. Design of filling opening, excluding CO_2 fire extinguishers (EN 3-7:2004+A1:2007,clause 6.3)

Provision to vent pressure	(yes/no)	Yes
Pressure released within one third of complete disassembly	(yes/no)	Yes
Measured diameter of filling opening	(mm)	27.4
Minimum required diameter	(mm)	≥ 25
Conformity to clause 6.3 (yes/no): Yes		

9. Duration of operation, minimum duration (EN 3-7:2004+A1:2007,clause 7.1.1)

Sample		1	2	3
Measured duration of operation	(s)	41.9	49.6	53.5
Required duration of operation	(s)	≥ 15		
Conformity to clause 7.1.1 (yes/no): Yes				

10. Duration of operation, spread of measurement (EN 3-7:2004+A1:2007,clause 7.1.2)

Deviation of measured time from average discharge duration				
Average discharge duration (s): 48.3				
Sample		1	2	3
Actual Deviation	(%)	-13.3	+2.6	+10.7
Required Deviation	(%)	≤ 15		
Conformity to clause 7.1.2 (yes/no): Yes				

11. Residue charge (EN 3-7:2004+A1:2007,clause 7.2)

Nominal charge of fire extinguisher: 9 litre				
Sample		1	2	3
Determined residue charge	(kg)	0.4	0.4	0.3
Residue as a percentage of nominal charge				
Actual residue	(%)	4.5	4.6	3.8
Maximum permissible residue	(%)	≤ 10		
Conformity to clause 7.2 (yes/no): Yes				

12. Commencement of discharge (EN 3-7:2004+A1:2007,clause7.3)

Sample		1	2	3
Commencement of discharge measured	(%)	< 1	< 1	< 1
Commencement of discharge required	(%)	≤ 4		
Conformity to clause 7.3 (yes/no): Yes				

13. Effective range of operating temperature (EN 3-7:2004+A1:2007,clause 7.4)

Temperature cycling		Cycle A		Cycle B	
Sample		1	2	3	4
Temperature at start of cycle	(°C)	T_{min}:5	T_{min}:5	T_{max}:60	T_{max}:60
Temperature at end of cycle	(°C)	T_{max}:60	T_{max}:60	T_{min}:5	T_{min}:5
Commencement of discharge, actual	(s)	< 1	< 1	< 1	< 1
Commencement of discharge, required	(s)	≤ 10			
Duration of operation, actual	(s)	48.3	46.2	56.6	49.1
Maximum duration of operation, required	(s)	96.6[a]			
Minimum duration of operation,required	(s)	≥ 6			
Duration of operation of CO_2, actual	(s)	Not applicable		Not appilcable	
Maximum duration of operation for CO_2, required	(s)	Not applicable[b]		Not applicable[c]	
Residue charge, actual	(%)	0	1	1	1
Residue charge, required	(%)	≤ 10[d]			
Conformity to clause 7.4(yes/no): Yes					

[a] : The maximum duration of operation shall be not more than twice the value established at a temperature of 20°C for all extinguishers except CO_2.
[b] : For CO2 tested at Tmax, the duration of operation shall be less or equal than the duration measured at 20°C
[c] : For CO2 tested at Tmin, the duration of operation shall be less or equal to 2.5 times than the duration measured at 20°C
[d] : Maximum 15% for BC powder,maximum 10% for all other agents

14. Verification of retention of propellant (EN 3-7:2004+A1:2007,clause 8.1)

Periodic verification of propellant possible	(yes/no)	Yes
Verification method	(by weighing / by pressure)	By pressure
Verification device	(connection / gauge / indicator)	Gauge
Conformity to clause 8.1 (yes/no) : Yes		

15. Leakage acceptance level (EN 3-7:2004+A1:2007, Clause 8.2)

Sample		1	2
Stored pressure extinguisher			
Actual leakage [a]	(%)	0	0
Required rate of leakage	(%/year)	≤ 6	
Extinguisher and/or gas cartridges checked by weighing		Not applicable	
Actual leakage [b]	(%)	-	-
Required rate of leakage	(% wt /year)	≤ 5	
Gas cartridge extinguishers:		Not applicable	
Actual leakage [c]	(%)	-	-
Required rate of leakage	(cm^3/min/kg/l)	≤ 5	
Conformity to clause 8.2 (Yes/No) :Yes			

[a] : For stored pressure extinguishers, ≤6% of the expanded free gas volume at 20°C

[b] : For propellant cartridges and CO_2 extinguishers, ≤5% of the nominal charge

[c] : For gas cartridge extinguishers, gas leakage of ≤5 cm^3/(minute or Kg or litre of charge of the extinguisher)

16. Dielectric test, for water based extinguishers (EN 3-7:2004+A1:2007,clause 9.2) **– Not applicable**

17. General requirement for use of extinguishers (EN 3-7:2004+A1:2007,clause 10.1)

Capable to use the extinguisher without mounting, removal or modifying of any component except for the safety device	(yes/no)	Yes
Conformity to clause clause 10.1 (yes/no) : Yes		

18. a) Operating for CO2 extinguisher (EN 3-7:2004:A+1:2007,clause10.2) – **Not applicable**

18. b) Operating force for other extinguisher (EN 3-7:2004:A+1:2007,clause10.2)

1st Device

Activation without repetition of action (yes/no): Yes					
Force for activated the extinguisher		at T_{min} 5°C		at T_{max} 60°C	
Sample		1	2	3	4
Measure force to activate finger trigger	(N)	Not applicable		Not applicable	
Maximum permissible force to activate finger trigger	(N)	≤ 100			
Measured force to activate squeeze grip trigger	(N)	40.6	40.2	29.9	34.9
Maximum permissible force to activate squeeze grip trigger	(N)	≤ 200			
Measured force to screw down hand wheel [a]	(N)	Not applicable		Not applicable	
Maximum permissible force to screw down hand wheel [a]	(N)	≤ 100			
Measured energy to strike knob	(N)	Not applicable		Not applicable	
Maximum permissible energy to strike knob	(N)	≤ 2			
Conformity to clause 10.2 (yes/no): Yes					

[a] Measured at outside the wheel.Maximum of 360° rotation to full open position

18. c) Operating force for other extinguisher (EN 3-7:2004:A+1:2007,clause10.2) 2nd device
– **Not applicable**

19. Safety devices (EN3-7:2004+A12007, clause10.3)

Release of safety device distinct from operating mechanism (yes/no): Yes						
Removal of safety device can be seen (yes/no): Yes						
Force to release safety device at temperature		at T_{min} 5°C		at 20°C	at T_{max} 60°C	
Sample		1	2	3	4	5
Measured force	(N)	21	20	34	95	21
Pemissible force	(N)	20 to 100				
Unaided attempt to initiate discharge without release of safety device						
Sample				1		2
Deformation or damage of operating mechanism in case of double force	(yes/no)			No		No
Conformity to clause10.3 (yes/no): Yes						

20. Filter for water based extinguishers (EN 3-7:2004+A1:2007,clause10.4)

Filter position upstream of smallest orifice	(yes/no)	yes
Area of each filter orifice smaller that smallest are of the discharge passage	(yes/no)	yes
Area of smallest orifice in discharge passage	(mm^2)	0.5
Total area of orifices	(mm^2)	94.5
Total filter area 8 times larger than the smallest orifice area	(yes/no)	yes
Filter accessible for maintenance	(yes/no)	yes
Conformity to clause 10.4 (yes/no) : Yes		

21. a) Hose and coupling systems, for CO_2 extinguisher (EN 3-7:2004+A1:2007,clause10.5)
Not applicable

21. b) Hose and coupling systems, for other extinguisher (EN 3-7:2004+A1:2007,clause10.5)

Burst pressure of hose (bar) at T_{min}, 20°C and T_{max} (°C)						
Sample		1	2	3	4	5
Measured test temperature	(°C)	20	60	60	5	6
Required test temperature	(°C)	20 ± 5	T_{max} 60± 2		T_{min} 5± 2	
Measured burst pressure	(bar)	80	70	70	85	85
Minimum required burst pressure	(bar)	41 [≥ 3 x P(T_{max})]	28 [≥ 2 x P(T_{max})]			
Functional throughout operating temperature range (yes/no) : Yes						
Coupling system design and fitted in a way that they cannot damage the hose (yes/no) : Yes						
Conformity to clause 10.5 (yes/no) : Yes						

22. a) Control valve, for CO2 extinguishers (EN 3-7:2004+A1:2007,clause10.6.1,10.6.4)
- Not applicable

22. b) Control valve, for 1and 2kg powder extinguisher (EN 3-7:2004+A1:2007,clause10.6.1,10.6.3)
- Not applicable

22. c) Control valve, for other extinguishers (EN 3-7:2004+A1:2007,clause10.6.1 and 10.6.2)

Equipped with self-closing discharge valve (yes/no): Yes			
Sample		1	2
Initial pressure before discharge (P_1)	(bar)	11.6	12
Average duration of operation of extinguisher (T_2)	(s)	48.3	
Measured discharge duration (T_1)	(s)	2.5	2.7
Actual ratio of $T_1 – T_2$	(%)	5.2	5.6
Permissible ratio of $T_1 – T_2$	(%)	5 to 15	
Remaining pressure (P_2) measured within 10s of completion of partial discharge	(bar)	8.2	8.5
Remaining pressure (P_3) measured after 5 min of completion of partial discharge	(bar)	8.2	8.5
Actual ratio of $P_3 – P_1$	(%)	70.7	70.8
Permissible ratio $P_3 – P_1$	(%)	≥ 50	
Actual ratio of $P_3 – P_2$	(%)	100	100
Permissible ratio $P_3 – P_2$	(%)	≥ 80	
Conformity to clause 10.6.1 & 10.6.2 (yes/no) : Yes			

23. Pressure gauge (EN 3-7:2004+A1:2007,clause11.1.1)

Pressure gauge present	(yes/no)	Yes
Capable of being checked on good working order with an external pressure	(yes/no/not applicable)	Yes
Conformity to clause 11.1.1 (yes/no): Yes		

24. Pressure gauge (EN 3-7:2004+A1:2007, clause 11.1.2)

Calibrated scale in bars	(yes/no)	Yes
Zero zone	(yes/no)	Yes
End stop on zero zone	(yes/no)	No
End stop at negative pressure side of zero zone	(yes/no)	NA
Pointer contact end stop	(yes/no)	NA
Green zone between operating pressure	(yes/no)	Yes
Tolerance of -15% for pressure at T_{min}	(yes/no)	Yes
Tolerance of +6% for pressure at T_{max}	(yes/no)	Yes
Pressure round off to full or half bar	(yes/no)	Yes
Side zones of green zone colored red	(yes/no)	Yes
Operating pressure at 20°C indicated	(yes/no)	Yes
Scale length ≥ 1.5 x length from zero to high pressure end of green zone	(yes/no)	Yes
Pointer radially into green zone with length of between 50% and 8% of green zone height	(yes/no)	Yes
Position of pointer clearly visible at ends of green zone and at operating pressure at 20°C	(yes/no)	Yes
Conformity to 11.1.2 (yes/no): Yes		

25. Pressure gauge error after cycling (EN 3-7:2004+A1:2007, clause11.1.3)

Sample		Initial			After 1000 cycles		
		1	2	3	1	2	3
Beginning of green zone	(bar)	9.8	9.9	9.7	10.0	10.1	9.8
Error ≤ 1 bar	(yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
End of green zone	(bar)	14.4	14.4	14.7	14.6	14.5	14.8
Error ± 6%	(yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
Operating pressure at 20°C	(bar)	12.0					
Indication at 20°C	(bar)	12.1	12.1	12.1	12.2	12.2	12.1
Error ≤ ±0.5 bar	(yes/no)	Yes	Yes	Yes	Yes	Yes	Yes
Conformity to clause 11.1.3: (yes/no): Yes							

26. Compatibilty of pressure gauge materials (EN 3-7:2004+A1:2007,clause 11.1.4)

Gauge material compatible with extinguishing medium and propellant (yes/no): Yes
Conformity to clause 11.2 (yes/no): Yes

27. Pressure Indicator (EN 3-7:2004+A1:2007,clause 11.2) – **Not applicable**

28. Horn resistance to static load (EN 3-7:2004+A12007,clause 12.1) – **Not applicable**

29. Horn resistance to static load (EN3-7:2004+A1:2007,clause 12.2) – **Not applicable**

30. Security of horn / hose fixing (EN3-7:204+A12007,12.3) – **Not applicable**

31. Horn resistance to temperature (EN 3-7:2004+A1:2007,clause 12.4) – **Not applicable**

32. Mounting bracket (EN 3-7:2004+A1:2007,clause 13)

Easy removal extinguisher from bracket	(yes/no)	Yes
Method of removal is obvious	(yes/no)	Yes
Capable of supporting twice the total mass of extinguisher without permanent damage	(yes/no)	Yes
Conformity to clause 13 (yes/no) : Yes		

33. Resistance to external corrosion (EN 3-7:204A1+2007,clause 14.1)

Observations after the salt spray test as per H.1 of Annex H:			
Sample		1	2
Operating force for CO_2 extinguisher clause 10.2	(yes/not applicable)	Not applicable	
Measured force to activate operating device	(N)	-	-
Maximum permissible force to activate operating device	(N)	≤ 200	
Operating force for other extinguishers clause 10.2	(yes/not applicable)	Not applicable	
Measured force to activate finger trigger	(N)	Not applicable	
Maximum permissible force to activate finger trigger	(N)	≤ 100	
Measured force to squeeze grip lever	(N)	50.5	48.3
Maximum permissible force to squeeze grip lever	(N)	≤ 200	
Measured force to screw down hand wheel	(N)	Not applicable	
Maximum permissible force to screw down hand wheel	(N)	≤ 100	
Measure energy to strike knob	(J)	Not applicable	
Maximum permissible energy to strike knob	(J)	≤ 2	
Force to release safety device – clause 10.3			
Measured force to release safety device	(N)	51.5	98.1
Permissible force to release safety device	(N)	20 to 100	
Duration of operation – clause 7.1.2:			
Measured duration of operation	(s)	48.4	41.9
Average discharge duration (see item 10)	(s)	48.3	
Deviation of measured value from the average	(%)	0.2	13.3
Maximum permissible deviation	(%)	± 25	
Pressure gauge or pressure indicator indicates no pressure after pressure release	(yes/no/not applicable)	Yes	Yes
Burst pressure of hose – clause 10.5 (1)	(yes/no)	Not applicable	
Measured burst pressure	(bar)	-	-
Minimum required burst pressure	(bar)	-	
Burst pressure of hose – clause 10.5(2)	(yes/no)	Yes	
Measured burst pressure	(bar)	80	80
Minimum required burst pressure	(bar)	21	
Corrosion of metal likely to impair the operation or safety of the fire extinguisher	(yes/no)	No	
Conformity to Clause 14.1 (yes/no) : Yes			

(1) CO_2 extinguishers: ≥1.5 x $P(T_{max})$; $P(T_{max})$ see item 21

(2) Other extinguishers: ≥ 3 x $P(T_{max})$; $P(T_{max})$ see item 21

34. Resistance to internal corrosion (EN 3-7:2004+A1:2007, Clause 14.2)

Observations after the salt spray test as per H.2 of Annex H:			
Sample		1	2
Evidence of corrosion	(yes/no)	No	No
Detachment of protective coating	(yes/no)	No	No
Cracking of protective coating	(yes/no)	No	No
Bubbling of protective coating	(yes/no)	No	No
Change of colour of agent [a]	(yes/no)	No	No
Conformity to clause 14.2 (yes/no): Yes			

[a] Except for change resulting from thermal cycling

35. Class A fire rating (EN 3-7:2004+A1:2007,clause 15.2)

Test No		1	2	3
Fire size			13A	
Moisture content of wood: Measured average	(%)	15	15	-
Permissible average	(%)		10 to 15	
Measured ambient condition within test room	(°C)	29	29	-
Permissible temperature within the test room before ignition	(°C)		0 to 30	
Measured oxygen concentration throughout test	(%)	19.8	19.8	-
Minimum required oxygen concerntration throughout	(%)		≥ 19	
Test fire extinguished	(yes/no)	Yes	Yes	-
Measured time to extinguished test fire	(min:s)	2:44	2:52	-
Maximum permissible extinguishing time [1]	(min)		≤ 5	
Achieved test fire rating – Class A	-		13A	
Minimum required fire rating[a]	-		13A	
Conformity to clause 15.2 (yes/no):Yes				

[a] As per tables 3 or 4 of clause 6.4.2
[1] ≤ 5 min for fires ≤ 21A & ≤ 7 min for fires ≥ 27A

36. Class B fire rating (EN 3-7:2004+A1:2007 clause 15.3) - **Not applicable**

37. Class B – Polar solvent fire test (EN 3-7:2004+A1:2007,15.3) - **Not applicable**

38. Class F fire rating (EN 3-7:2004+A1:2007,clause 15.4) – **Not applicable**

39. Fire extinguisher identification,colour (EN 3-7:2004+A1:2007, Clause 16.1)

Colour of extinguisher body red RAL 3000	(yes/no)	Yes
Colour coded for extinguishant	(yes/no)	Yes
Coded area ≤ 10% of body surface area	(yes/no)	Yes
National reglation for colour code extinguihant applicable	(yes/no)	Yes
Conformity to Clause 16.1 (yes/no) : Yes		

40. Marking (EN 3-7:2004+A1:2007,clause 16.2)

Conformity to Clause 16.2 (yes/no) : Yes

41. Prototype testing, burst test under pressure (EN 3-8:2006, Clause 6.3.2)

Sample		1	2	3	4	5
Marked applied	(yes/no)	Yes	Yes	Yes	Yes	Yes
Pressure at maximum operating temperature,PT_{max}	(bar)	13.8				
Bursting pressure(P_r)						
Measured	(bar)	125	100	95	100	115
Required [1]	(bar)	≥ 55				
- fragmentation	(yes/no)	No	No	No	No	No
- main break showing sign of brittleness	(yes/no)	No	No	No	No	No
- material defect shown	(yes/no)	No	No	No	No	No
- break originates in marking area, brazed joint, weld of body	(yes/no)	No	No	No	No	No
Conformity to clause 6.3.2 (yes/no) : Yes						

[1] The bursting pressure *Pr* shall not be less than 2.7 times the maximum allowable pressure *PS* subjected to a minimum of 55bar

42. **Mechanical strength crushing test** (EN 3-8:2006, Clause 6.3.3)

Diameter of body	(mm)	180				
Longitudinal weld	(yes/no)	No				
Traverse weld	(yes/no)	Yes				
Actual angle to the support	(°)	45°				
Required angle to the support	(°)	45°				
Sample		1	2	3	4	5
Duration of crushing procedure						
Actual	(s)	30	30	30	30	30
Required	(s)	30 to 60				
Deformation after crushing procedure						
Actual	(mm)	18.0	18.0	18.0	18.0	18.0
Required [a]	(mm)	18 ± 1.8				
Pressure test						
Actual	(bar)	20	20	20	20	20
Required [b]	(bar)	≥ 20				
Cracks or leaks	(yes/no)	No	No	No	No	No
Conformity to clause 6.3.3 (yes/no): Yes						

[a] 10 ± 1% of cylinder external diameter

[b] 1.43 x $P(T_{max})$ or 20 bar minimum

43. **Pressure test – bodies, fittings and assemblies** (EN 3-8:2006, Clause 6.3.4)

Pressure at maximum operating temperature $P(T_{max})$: 13.8						
Sample		1	2	3	4	5
Applied pressure	(bar)	30	30	30	30	30
Required pressure[(1)]	(bar)	≥ 20				
Test pressure duration						
Measured duration	(s)	30				
Required duration	(s)	≥ 30				
Measured increase in body volume	(%)	0	0	0	0	0
Permitted increase in volume	(%)	≤ 1				
Fitting shall remain tight and show no dangerous defect	(yes/no)	Yes	Yes	Yes	Yes	Yes
Test on assembly						
Assembly shall remain tight and show no dangerous defect	(yes/no)	Yes	Yes	Yes	Yes	Yes
Conformity to clause 6.3.4 (yes/no): Yes						

[(1)] 1.43 x $P(T_{max})$ or 20 bar minimum

44. Pressure test – pressure gauges and pressure indicators (EN 3-8:2006, clause 6.3.5)

Sample		1	2	3	4	5
Pressure at maximum operating temperature $P(T_{max})$	(bar)	13.8				
Test pressure						
Actual test pressure	(bar)	35	35	35	35	35
Required test pressure[1]	(bar)	≥ 34.5				
Visible leak	(yes/no)	No	No	No	No	No
Ejection of any component	(yes/no)	No	No	No	No	No
Conformity to clause 6.3.5(yes/no): Yes						

[1] ≥ 2.5 x $P(T_{max})$

45. Macroscopic examination of the body (EN 3-8:2006, clause 6.3.6)

Sample		1	2	3	4	5
Complete fusion	(yes/no)	Yes	Yes	Yes	Yes	Yes
Visible defects	(yes/no)	No	No	No	No	No
Microscopic examination required	(yes/no)	No	No	No	No	No
Conformity to clause 6.3.6 (yes/no): Yes						

46. Overfill pressure test, for water based cartridge only (EN 3-8:2006, Clause 6.4) **– Not applicable**

47. Resistance to impact (EN 3-8:2006, Clause 6.5)

Sample		1	2	3	4
Actual test temperature	°C	+5		+60	
Required test temperature	°C	TS_{min} 5 ± 2		TS_{max} 60 ± 2	
Orientation of sample [Vertical (V) / Horizontal (H)]		V	H	V	H
Evidence of bursting , breakage or ejection of components. No dangerous leaks are acceptable	(yes/no)	No	No	No	No
Conformity to clause 6.5 (yes/no): Yes					

48. Marking – body (EN 3-8:2006, Clause 9.2)

Mark of the body manufacturer as registered for identification	(yes/no)	Yes
Serial or batch number	(yes/no)	Yes
Year of manufacture	(yes/no)	Yes
Test pressure in bar, with letters PT before and followed by "BAR" or "bar"	(yes/no)	Yes
Conformity to clause(yes/no): Yes		

49. Marking - extinguisher (EN3-8:2006, clause 9.3)

Mark of the body manufacturer as registered,for identification	(yes/no)	Yes
serial or batch number	(yes/no)	Yes
year of manufacture	(yes/no)	Yes
working pressure at 20°C	(yes/no)	Yes
capacity/size of gas cartridge (gas cartridge only)	(yes/no)	NA
identification of propellant gas	(yes/no)	Yes
operating temperature range of the extinguisher assembly	(yes/no)	Yes
test pressure in bar, with letters PT before and followed by "BAR" or "bar"	(yes/no)	Yes
Conformity to clause 9.3 (yes/no): Yes		

Annex 1: Photograph of fire extinguisher label as submitted

Annex 2: List of document not included in this report, but registered by the laboratory

- Assembly drawing for Model KW-9EN, dated Oct-2018
- Dip tube drawing for Model KW-9EN, dated Nov-2018
- Nitrogen MSDS dated Aug-2018

Annex 3: Photograph of portable fire extinguisher as submitted (label as per annex 2)

PSB Singapore

Please note that this Report is issued under the following terms :

1. This report applies to the sample of the specific product/equipment given at the time of its testing/calibration. The results are not used to indicate or imply that they are applicable to other similar items. In addition, such results must not be used to indicate or imply that TÜV SÜD PSB approves, recommends or endorses the manufacturer, supplier or user of such product/equipment, or that TÜV SÜD PSB in any way “guarantees” the later performance of the product/equipment. Unless otherwise stated in this report, no tests were conducted to determine long term effects of using the specific product/equipment.

2. The sample/s mentioned in this report is/are submitted/supplied/manufactured by the Client. TÜV SÜD PSB therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture, consignment or any information supplied.

3. Nothing in this report shall be interpreted to mean that TÜV SÜD PSB has verified or ascertained any endorsement or marks from any other testing authority or bodies that may be found on that sample.

4. This report shall not be reproduced wholly or in parts and no reference shall be made by the Client to TÜV SÜD PSB or to the report or results furnished by TÜV SÜD PSB in any advertisements or sales promotion.

5. Unless otherwise stated, the tests were carried out in TÜV SÜD PSB Pte Ltd, No.1 Science Park Drive Singapore 118221.

July 2011