

K21045  
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# Specific Certification Program Fire Protection Systems – Components

Extinguishing of pool fires (liquid fuels)



Trust  
Quality  
Progress

# Preface

This specific certification program has been accepted by the Kiwa Board of Experts Fire Safety, in which all relevant parties in the field of Fire Protection Systems are represented. The Board of Experts also supervises the certification activities and where necessary requires the evaluation guideline to be revised. All references to Board of Experts in this evaluation guideline pertain to the above mentioned Board of Experts.

This certification program will be used by Kiwa in conjunction with the Kiwa Regulations for Certification within the context of Certification Scheme K21045 "Fire Protection Systems".

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# 1 Introduction

## 1.1 General

This specific certification program includes all relevant requirements which are employed by Kiwa when dealing with applications.

This specific certification program is a first version and shall be used in context with product certification scheme K21045 "Fire Protection Systems".

In warehousing are flammable fluids present. In the case that these flammable fluids are escaping out of their containment during an incident can create a powerful pool fire. Kiwa has drafted this initial type testing protocol to prove the effectiveness of fire protection systems in the scenario of a pool fire.

## 1.2 Field of application / scope

The performance requirement for large liquid fires of the fire extinguishing component is determined following The fire extinguishing system shall meet the assessments for Class B according to EN2.

Based on the results of this test protocol in this specific certification program is additional listing possible.

## 1.3 Acceptance of test reports provided by the supplier

See TIC scheme K21045.

## 1.4 Quality declaration

See TIC scheme K21045.

## 2 Terms and definitions

See TIC scheme K21045.

### **3 Procedure for granting a product certificate**

See TIC scheme K21045.

# 4 Setup of this specific certification program

## 4.1 General

This chapter contains the setup for the specification certification program.

For the performance of its certification work, Kiwa is bound to the requirements as included in EN-ISO/IEC 17065 "Conformity assessment - Requirements for bodies certifying products, processes and services" and certification scheme K21045.

This program describes a test plan large pool fires.

It describes the test requirements and/or laboratories to be used for the testing, identifies the tests to be performed and provides in minimal schedules for test activities.

# 5 Testing the performance of the system

## 5.1 Test protocol abstract

The test objective is a liquid fire in a test room of 1250 m<sup>3</sup>. The room shall have the following minimum dimensions: length 8 m, width 8 m, height 12 m. These dimensions shall be scaled up to 1250 m<sup>3</sup>. Central in the room is a steel fire pan positioned of 1.8 x 1 m and a height of 10 cm. The fire pan shall contain a layer of 45 l heptane on 5 cm of water with a burning time of at least 5 minutes and a power of approx. 6 MW.

The pan shall be placed on the floor.

The fire extinguishing components shall be suspended in accordance with the supplier's specifications and distributed as specified by the supplier.

The fire cell shall be placed at the edge of the radius of the design extinguishing area.

The heptane shall be ignited for each test and have a free burning time of 30 seconds. After the end of the activation of the fire extinguishing agent the room shall remain closed for at least 10 minutes.

During this period the cell shall be monitored for signs of active fire and signs of spontaneous activation, based on the temperature measurements in the vicinity of the fire cell.

After this period the cell shall be inspected visually for signs of active fire and signs of active activation outside the test room without the presence of the fire extinguishing agent. Any signs of fire shall be described in the report. The temperature after extinguishing shall be decisive. Visible fire is considered as a sign of spontaneous activation, but solely smoke is not.

The result of the assessment and tests shall be declared in the attachment of the product certificate.

Note: it is possible to test other fuels. Fuel quantity shall be altered to achieve a power of approx. 6 MW.

## 5.2 Test protocol detail

The test is carried out in a sufficient air-tight room. Doors and windows shall be closed. However, a limited "open" area, for example small gaps/notches between wall and ceiling may be present. Any forced ventilation system or apparatus/system that will affect the density in the room, shall be shut down. The test shall be based on the exact arithmetical calculation of the number of grams per volume unit as this governs the value stated in the supplier specifications. There shall be no physical obstructions in the room.

The design formula shall allow for a quantity of remaining extinguishing agent in the extinguishing generator.

When testing Class B fires the operation of the extinguishing generator in relation to its dispersal shall be tested more extensively.

The test of the fire extinguishing effect shall be made under the following conditions.

With regard to	Requirement/ Function	Unit	Tolerance
Fire class Assessment method to EN2 and applicable standard	According Fire Class B	N/A	N/A
Thermal energy/power	See fire extinguishing test or objective	N/A	N/A
Burning time due to catalyst	See fire extinguishing test or objective	Minutes	± 15 sec



With regard to	Requirement/ Function	Unit	Tolerance
Catalyst	Heptane	N/A	N/A
Relative humidity in the room, before the fire, measured with a hygrometer	60	%	± 20%
Ambient temperature before	Accordinging test protocol	°C	Accordinging test protocol
Temperature in the test room	20 or ambient Note: According test procedure. Otherwise determined using at least 2 thermocouples on the ceiling with ΔT 10 sec recording using a data logger	°C	5, N/A for ambient
Thermocouples	The use of K type thermocouples (Ni-CrNi), diameter 1 mm, is recommended.	N/A	N/A
Dimensions of the test room	Accordinging test protocol	m and m <sup>3</sup>	- 0 / + XX
Ventilation during the pre-burning time and free burning time, using constant measurement	Adequate ventilation	N/A	N/A
“Open” area or leakage area and position during extinguishing	0.1% max. of the volume of the room, distributed evenly across the room *	% in m <sup>2</sup>	-0.1 / +0
Air flow through the room	Non-forced (Natural), <1	m/s	-1 / +0
Oxygen level in the room	Accordinging test protocol	% O <sub>2</sub>	Accordinging test protocol
Closing of the test room after igniting the fire	Accordinging test protocol	s	N/A
Required amount of fire extinguishing agent	Supplier’s design formula	gram/m <sup>3</sup>	Supplier’s design formula
Extinguishing time	Accordinging test procedure and generator type	s	Accordinging test protocol
Monitoring time	Accordinging test procedure	s	Accordinging test protocol
Agent discharge	Accordinging test protocol	s	Accordinging test protocol
Weight of agent to determine percentage of agent discharged	Before and after extinguishing, any generator type	gram	± 5
Activation	Supplier’s system	N/A	N/A
Electrical activator	Measurement of resistant accordinging generator type.	Ω	± 1
<b>Instrumentation</b>			
Weighing scale	Measurement (Incremental) from approx. 0 till approx. 75	Kg	± 0.005
Oxygen meter	Measurement from approx. 0 till approx. 25	% O <sub>2</sub>	± 0.1
Multi meter	Measurement of resistance from approx. 0 till approx. 30	Ω	± 0.1
<p>* “Open” area or leakage area during extinguishing = 0.1% (e.g.: 1000 m<sup>3</sup> = 1 m<sup>2</sup> and 100 m<sup>3</sup> = 0.1 m<sup>2</sup>).</p> <p>“Open” areas are generally allowed as, for example, small gaps/notches between wall and ceiling <u>but not</u> as, for example, open ventilation piping or a hole/opening in a wall or ceiling.</p> <ul style="list-style-type: none"> <li>• Open ventilation piping or a hole/opening in a wall or ceiling are to be considered as a an defect regarding the architectural and/or technical <u>design</u> of the room.</li> <li>• Small gaps/notches between wall and ceiling are to be considered as a an defect regarding the architectural <u>finishing</u> of the room.</li> </ul>			

### **5.3 Mandatory registrations during the test**

Mandatory registrations during the test in seconds are:

- Time of activation of the heptane.
- Pre burning time (catalyst)
- Free burning time
- Time of initial activation of the fire extinguishing generator.
- End of the discharge of the generator.
- Time at which the flames are extinguished (if possible)
- Soak time

There shall be adequate ventilation during the pre-burning and free burning time and the oxygen concentration in the test room shall be maintained. If this cannot be guaranteed then during the activation the oxygen percentage at the level of the source of fuel shall not deviate more than 0.5 vol% from the normal percentage under ambient conditions and the oxygen percentage shall be measured with a calibrated oxygen gauge using a sensor at the same level as the source of fuel.

# 6 Factory Production Control Fire Protection Components by Kiwa

See TIC- scheme K21045.

# 7 Inspection of Fire Protection Systems by Kiwa

See TIC- scheme K21045.

# 8 Marking

## 8.1 General

See TIC scheme K21045.

## 8.2 Certification mark

See TIC scheme K21045.

## 9 Requirements in respect of the quality system

See TIC scheme K21045.

# 10 Summary of tests and inspections

See TIC scheme K21045.

# 11 Agreements on the implementation of certification

See TIC scheme K21045.



# 12 Titles of standards

## 12.1 Public law rules

See TIC scheme K21045.

## 12.2 Standards / normative documents

See TIC scheme K21045.

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