Certificate

Product Certificate

K-0228547-1

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Fire Protection Systems - Products

ADC MAKİNE SAN. VE TİC. LTD.ŞTİ

Statement by Kiwa

Kiwa states with this product certificate, that is issued in accordance with the Kiwa Regulations for Certification, that there is legitimate confidence that the products provided by

ALAS Fire Technologies

meets the requirements of certification scheme K21045/02 – Fire Protection Systems version 2021-03-30 for the scope: E. Aerosol Systems.

Kiwa Nederland B.V. gives the certification trademark in license to FirePro Systems Ltd for the products provided under certificate.

Signature

Wim van Loon
Managing Director Nederland

This certificate remains the property of Kiwa. Publication of this certificate is allowed.
The validity of the accreditation can be verified at the accreditation body (www.rva.nl).

PRODUCTS
RvA C 002

Version

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Technical specification & approval
The Kiwa Certification Scheme K21045/02 “for Fire Protection Systems – product scope E - for non-pressurized condensed aerosol generators and components used in fixed fire extinguishing systems” is based on the following standards:
•EN15276-1 Fixed fire fighting systems – Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components;
•ISO 15779 Condensed aerosol fire extinguishing systems - Requirements and test methods for components and system design, installation and maintenance - General requirements.

The following Aerosol Generators belong to this product approval.

Type	Housing Red Coated Steel	Activation Type		Number of outlets
		Thermal	Electrical	
IP 6100	Hexagon Box	No	Yes	1
IP 4600	Hexagon Box	No	Yes	1
IP 3500	Hexagon Box	No	Yes	1
IP 2300	Hexagon Box	No	Yes	1
IP 1400	Hexagon Box	No	Yes	1
IP 530	Hexagon Box	No	Yes	1
IP 220	Hexagon Box	No	Yes	1
IP 110	Hexagon Box	No	Yes	1
IP 55	Hexagon Box	No	Yes	1
IP 25	Hexagon Box	No	Yes	1

Non-pressurized generators.

Application and use
It is important that the fire protection of a building or plant be considered as a whole. Condensed aerosol extinguishing systems form only a part, though an important part, of the available facilities, but it should not be assumed that their adoption necessarily removes the need to consider supplementary measures, such as the provision of portable fire extinguishers or other mobile appliances for first aid or emergency use, or to deal with special hazards.

Condensed aerosol extinguishants are an effective medium for the extinction of flammable liquid fires (Class B according to EN2), and ordinary Class A to EN2 hazards (solid surface burning fires), but it should not be forgotten, in the planning of comprehensive schemes, that there may be hazards for which these mediums are not suitable, or that in certain circumstances or situations there may be dangers in their use requiring special precautions.

Advice on these matters can be obtained from the approved supplier of this manufacturer of the extinguishant and / or the extinguishing system according to scheme K23003 or K21045 scope E - installations. Information may also be sought from the appropriate fire authority, the health and safety authorities and insurers. In addition, reference should be made as necessary to other national standards and statutory regulations of the particular country.

It is essential that firefighting equipment be carefully maintained to ensure instant readiness when required. Routine maintenance is liable to be overlooked or given insufficient attention by the owner of the system. It is, however, neglected at peril to the lives of occupants of the premises and at the risk of crippling financial loss. The importance of maintenance cannot be too highly emphasized. Installation and maintenance should only be carried out by qualified personnel according to scheme K23003 or K21045 scope E - installations .

Inspection should include an evaluation that the extinguishing system continues to provide adequate protection for the risk (protected zones as well as state of the art can change over time).

Where aerosol generators are used in a potentially explosive application, the suitability of the generator to the atmosphere for the determined life shall be assessed.

Conditions for application
•The detail engineering and installation of the extinguishing system shall to be determined in conformity with the guidelines and calculation methods of the manufacturer.
•The user of the extinguishing system is instructed by an instructor for this system authorized by the supplier on behalf of the manufacturer.
•The detail engineering, installation and maintenance of the fire extinguishing components have to take place according to the specifications of the manufacturer, ISO15779, EN15276-2 and certification scheme K23003 or K21045 scope E - installations.
The minimal density for the extinguishing systems shall be based on a Class A according to EN2 for the compatible wood crib according to ISO15779. For risk associated with deep seated fires shall be based on a Class A wood crib test according to EN15276-1.

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Point of interest during use
The condensed aerosol extinguishing components should not be used on fires involving the following unless relevant testing by accredited testing laboratories has been carried out to the satisfaction of the Authority:
•Temperatures for use of aerosol extinguishing agents shall be within the supplier's listed limits.
•Local applications of condensed aerosol extinguishing systems are not covered by this product declaration. Local applications require a pre-engineered and pre-designed system which has been tested and approved for a specific application by an authority such as Kiwa or by an accredited testing laboratory.

Manual
At delivery the product should be accompanied by an operation manual in the English language, known and authorized by Kiwa.
Following minimum items shall be described:
•Type of aerosol generators;
•Design application density in relation to Fire Class according to EN2 with a minimum based on Fire Class A (compatible wood crib);
•Description of occupancies and hazards to be protected against;
•Specification of aerosol generators;
•Equipment schedule or list of materials for each piece of equipment or device, showing device name; supplier, model or part number and description;
•System calculation;
•Enclosure pressurization and venting calculations;
•Description of fire detection, actuation and control systems.
•Requirements for inspection, maintenance and testing of an aerosol fire-extinguishing system and for the training of inspection and maintenance personnel.

For specific details regarding the (DIOM) Design Installation,& Operating Manual, see EN15276-1&2 and ISO15779.

Marking
The products should be marked with the Kiwa®-mark.

kiwa CERTIFIED K21045 FIRE PROTECTION SYSTEMS	**Place of the mark:** • On the generator **Required specifications:** • Name of the product and supplier • Supplier's type designation • Production date and serial number • Mass of aerosol-forming compound • Temperature range • Storage humidity range • Service life • Distances as specified in table 5 of this certificate • Reference to the application instructions • Certification mark • Class A according EN2 • Class B according EN2 **Method of marking:** • Non-erasable and non-detachable; • Non-flammable; • Permanent and legible

RECOMMENDATIONS FOR CUSTOMERS:

1. Check at the time of delivery whether:
1.1 The system provider has delivered in accordance with the agreement;
1.2 The mark and the marking method are correct;

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2. If you should reject a system on the basis of the above, please contact:
2.1 ALAS Fire Technologies and, if necessary,
2.2 Kiwa

Consult the supplier’s processing guidelines for the proper storage and transport methods.

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Product specifications - approval

Table 1 – pre burn time – soak time – density of the aerosol

Fire Class	Listing	According EN 15276-1	Pre burn time	Soak period	Test room	Density
EN2	Material / fuel		in seconds	in seconds	in m^3	in grams / m^3
A	Wood crib	A.6.1	120	600	112,16	62,00
A	Class A compatible wood crib test	A6.4	120	600	112,16	49,75
A	Poly methyl methacrylate	A.6.3	210	600	112,16	49,39
A	Polypropylene	A.6.3	210	600	112,16	49,39
A	ABS	A.6.3	210	600	112,16	49,39
B	Heptane (830 Kilowatt)	A.6.2	30	30	112,16	74,89

Table 2 – Efficiency of the generator types

Type	Housing Type	Efficiency in %	Type	Housing Type	Efficiency in %
IP 6100	Hexagon Box	60	IP 530	Hexagon Box	70
IP 4600	Hexagon Box	60	IP 220	Hexagon Box	60
IP 3500	Hexagon Box	60	IP 110	Hexagon Box	55
IP 2300	Hexagon Box	60	IP 55	Hexagon Box	55
IP 1400	Hexagon Box	60	IP 25	Hexagon Box	70

Table 3 – Agent distribution of the generators

Type	Housing Type	Agent distribution according EN15276-1			
		Minimum height in m	Maximum area coverage in m	Maximum height in m	Maximum area coverage in m
IP 6100	Hexagon Box	2,86	6*2,86	6	2,86*2,86
IP 4600	Hexagon Box	2,86	4,5*2,86	4,5	2,86*2,86
IP 3500	Hexagon Box	2,86	3,42*2,86	3,42	2,86*2,86
IP 2300	Hexagon Box	2,25	2,86*2,86	2,86	2,25*2,86
IP 1400	Hexagon Box	1,37	2,86*2,86	2,86	1,37*2,86
IP 530	Hexagon Box	1,35	2*2	3,5	1,2*1,2
IP 220	Hexagon Box	1,00	1,35*1,35	1,2	1,2*1,2
IP 110	Hexagon Box	0,82	1,0*1,0	1,00	1,0*0,9
IP 55	Hexagon Box	0,41	1,0*1,0	1,0	1,0*0,41
IP 25	Hexagon Box	0,26	1,0*1,0	1,0	1,0*0,26

Table 4 – Discharge time of the generators

Type	Housing Type	Discharge time In Sec	Type	Housing Type	Discharge time In Sec
IP 6100	Hexagon Box	35± 5	IP 530	Hexagon Box	30± 5
IP 4600	Hexagon Box	25± 5	IP 220	Hexagon Box	18± 5
IP 3500	Hexagon Box	27± 5	IP 110	Hexagon Box	16± 5
IP 2300	Hexagon Box	20± 5	IP 55	Hexagon Box	15± 5
IP 1400	Hexagon Box	18± 5	IP 25	Hexagon Box	11± 5

Table 5 – radiated heat of the generators

Type	Housing Type	Distance in m		
		75°C	200°C	400°C
IP 6100	Hexagon Box	3	0.8	0.1
IP 4600	Hexagon Box	2,3	0.8	0.1
IP 3500	Hexagon Box	2,55	0.65	0.5
IP 2300	Hexagon Box	2,3	0.8	0.1
IP 1400	Hexagon Box	1,5	0.3	n/a
IP 530	Hexagon Box	1,2	n/a	n/a
IP 220	Hexagon Box	0.65	0.15	n/a
IP 110	Hexagon Box	0.1	n/a	n/a
IP 55	Hexagon Box	n/a	n/a	n/a
IP 25	Hexagon Box	3	0.8	0.1

Table 6

Listing		According EN15276-1	Leakage to volume ratio	Hold Time	Test room	Density
EN2	Test		in %	in minutes	in m^3	in grams / m^3
B	Hold Time	A.7	0.02	10	108,13	74,89
B	Hold Time (optional)	A.7.1.5	--	--	Not tested	Not tested

Cross reference EN 15276-1, Fixed fire fighting systems - Condensed aerosol extinguishing systems - Part 1: Requirements and test methods for components – 2019.

Chapter	Description	Demand [1)]	Result	Remarks and reference to relevant chapter, table(s) and tests (if available)
1.	Scope			
2.	Normative references			
3	Terms and definitions			
4	Component requirements			
4.1	Condensed aerosol generator	A	Pass	Drawings and product material specifications
4.2	Solid aerosol forming compound	A	Pass	Product material specifications – formula
4.3	Cooling mechanism	A	Pass	Drawings and product material specifications and function testing. See 5.11.
4.4.1	Ignition device	A	Pass	Drawings and product material specifications and function testing. See 5.12.
4.4.2	Electrical ignition device	A	Pass	
4.4.3	Thermal ignition device	N/A		
4.4.4	Other methods of ignition device	N/A		
4.5	End plate and housing	A	Pass	Drawings and product material specifications
4.6	Extinguishants	A	Pass	Product material specifications – formula
5.	Condensed aerosol generator requirements			
5.1	General Drawings; part lists; descriptions of function and operated instructions.	A	Pass	See 5.16 and 7.3 See table 2 See table 5
5.2	Extinguishing density Annex A	A	Pass	See 7.4 See table 1
5.3	Agent distribution	A	Pass	See 7.5 See table 3
5.4	Discharge time	A	Pass	See 7.14 See table 4
5.5	Ambient temperature and humidity operation ranges	A	Pass	See 7.6
5.6	Service life and service conditions	A	Pass	See 7.6 and 7.7

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Chapter	Description	Demand [1)]	Result	Remarks and reference to relevant chapter, table(s) and tests (if available)
5.7	Shelf life and storage conditions	A	Pass	Manual
5.8	Corrosion	A	Pass	See 7.8 and 7.9
5.9	Vibration	A	Pass	See 7.10
5.10	Mechanical shock	A	Pass	See 7.11 and 7.14
5.11	Discharge temperature			
5.11.2	Casing temperature	A	Pass	See 7.14
5.11.3	Aerosol flow temperature	A	Pass	See 7.14 See table 5
5.12	Activation device			
5.12.2	Electrical ignition device	A	Pass	See 7.13
5.12.3	Thermal ignition device	N/A		
5.13	Function reliability	A	Pass	See 7.14
5.14	Open fire conditions	A	Pass	See 7.15
5.15	Accessories – mounting brackets	A	Pass	See 7.8, 7.10 and 7.13.
5.16	Documentation; General description; Technical specification; Installation instructions; Operation instructions; Maintenance instructions; Safety Data Sheet	A	Pass	
6	Marking	A	Pass	K21045
7.	Test methods			
7.1	Conditions	A	Pass	
7.2	Samples	A	Pass	
7.3	Compliance	A	Pass	
7.4	Extinguishing density determination Annex A	A	Pass	See A6
7.5	Coverage determination Annex A	A	Pass	See A5 See table 3
7.6	Temperature and humidity operation range tests EN60068-2-30: 2005; 25 <> 55 °C at 95% with 10 cycles. Low temperature at -20 °C at 16 hours	A	Pass	

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Chapter	Description	Demand [1)]	Result	Remarks and reference to relevant chapter, table(s) and tests (if available)
7.7	Accelerated ageing test 15 years; -10 <> 50°C one cycle at 8 hours; 50 cycles. Start and end at -10 °C	A	Pass	15 years based EN 15276-1
7.8	Corrosion test	A	Pass	
7.9	Stress corrosion test	A	Pass	Materials used in the construction are not susceptible to ammonia stress corrosion
7.10	Vibration test EN-IEC 60068-2-6: 2008	A	Pass	Acceleration amplitude for components which are designed to be attached to machinery according EN-IEC 60068-2-6
7.11	Drop test	A	Pass	2 meter
7.12	Aerosol flow test	A	Pass	
7.13	Activation performance test	A	Pass	>200 activation devices are tested of the electrical activation device
7.14	Function test			
7.14.1	Discharge time	A	Pass	See table 4
7.14.2	Aerosol flow temperature	A	Pass	See table 5
7.14.4	Casing temperature test	A	Pass	
7.14.5	Efficiency	A	Pass	See table 2
7.15	Fire exposure test	A	Pass	Tested with normal electrical ignition device only
Annex A	(normative) Extinguishing factor/coverage test procedure			
A5	Aerosol generator distribution verification tests			
A5.1	Minimum height/maximum coverage test	A	Pass	The following types were tested: • All See table 3
A5.2	Maximum height test	A	Pass	The following types were tested: • All See table 3
A6	Extinguishing factor tests			
A6.1	Wood crib test	A	Pass	See table 1
A6.2	n-Heptane pan test	A	Pass	See table 1
A6.3	Polymeric sheet fire test A6.3.2.2 Polymethyl methacrylate (PMMA); A6.3.2.2 Polypropylene, A6.3.2.2 Acrylonitrile-butadiene-styrene polymer (ABS)	A	Pass	See table 1

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Chapter	Description	Demand [1)]	Result	Remarks and reference to relevant chapter, table(s) and tests (if available)
A6.4	Class A compatible wood crib test	A	Pass	See table 1
A7	Hold time	A	Pass	See table 6

[1)] A = Applicable N/A = Not Applicable Not tested

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Cross reference ISO 15779, Condensed aerosol fire extinguishing systems - Requirements and test methods for components and system design, installation and maintenance - General requirements (ISO 15779:2011,IDT), December 2011.

Chapter	Description	Demand [1)]	Result	Remarks
Annex C	(normative) Test methods			
C2	Conditions	A	Pass	
C3	Samples	A	Pass	
C4	Compliance	A	Pass	
C5	Extinguishing application density determination	A	Pass	See D4
C6	Discharge time	A	Pass	See C16
C7	Temperature and humidity operation range tests C7.1 Object of the test C7.2 Procedure C7.3 Low temperature	A	Pass	
C8	Accelerated ageing	A	Pass	15 years based EN 15276-1
C9	Corrosion	A	Pass	
C10	Stress corrosion	A	Pass	Materials used in the construction are not susceptible to ammonia stress corrosion.
C11	Vibration	A	Pass	Acceleration amplitude for components which are designed to be attached to machinery according EN-IEC 60068-2-6.
C12	Impact	A	Pass	Covered by Drop test, see C.13
C13	Drop	A	Pass	Drop test at 2 meters
C14	Casing and aerosol flow temperatures test C14.1 Casing temperatures C14.2 Aerosol flow temperature		Pass	See C.16.3 See C.16.2
C15	Ignition performance	A	Pass	
C16	Function test	A	Pass	
C16.1	Discharge time	A	Pass	See table 4
C16.2	Aerosol flow temperatures	A	Pass	See table 5
C16.3	Casing temperature	A	Pass	Manual
C16.4	Effective mass of extinguishant	A	Pass	See table 2
C16.5	Test procedure	A	Pass	

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Chapter	Description	Demand [1)]	Result	Remarks
C16.6	Requirements	A	Pass	
C17	Fire exposure	-	Pass	
Annex D	(normative) Extinguishing application density/coverage test procedure			
D5	Aerosol generator distribution verification tests			
D5.1	Minimum height/maximum coverage	A	Pass	The following types were tested: • All See table 3
D5.2	Maximum height	A	Pass	The following types were tested: • All See table 3
D6	Extinguishing application density tests			
D6.1	Wood crib	A	Pass	See table 1
D6.2	n-Heptane pan	A	Pass	See table 1
D6.3	Polymeric sheet fire test D6.3.2.2 Polymethyl methacrylate (PMMA); D6.3.2.2 Polypropylene, D6.3.2.2 Acrylonitrile-butadiene-styrene polymer (ABS)	A	Pass	See table 1
D6.4	Class A compatible wood crib	A	Pass	See table 1
D7	Test of the determination of the maximum leakage area/volume ratio	A	Pass	See table 6

1) A = Applicable N/A = Not Applicable Not tested

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Product specifications - Approval

Table 1

Listing		According ISO 15779	Pre burn time	Soak period	Test room	Density
EN2	**Material / fuel**		**in seconds**	**in seconds**	**in m^3**	**in grams / m^3**
A	Wood crib	D.6.1	120	600	112,16	62,00
A	Class A compatible wood crib test	D.6.4	120	600	112,16	49,75
A	Poly methyl methacrylate	D.6.3	210	600	112,16	49,39
A	Polypropylene	D.6.3	210	600	112,16	49,39
A	ABS	D.6.3	210	600	112,16	49,39
B	Heptane (830 Kilowatt)	D.6.2	30	30	112,16	74,89

Table 6

Listing		According ISO 15779	Leakage to volume ratio	Hold Time	Test room	Density
EN2	**Determination of the maximum leakage area/volume ratio**		**in %**	**in minutes**	**in m^3**	**in grams / m^3**
B	Hold Time	D.7	0.02	10	108,13	74,89