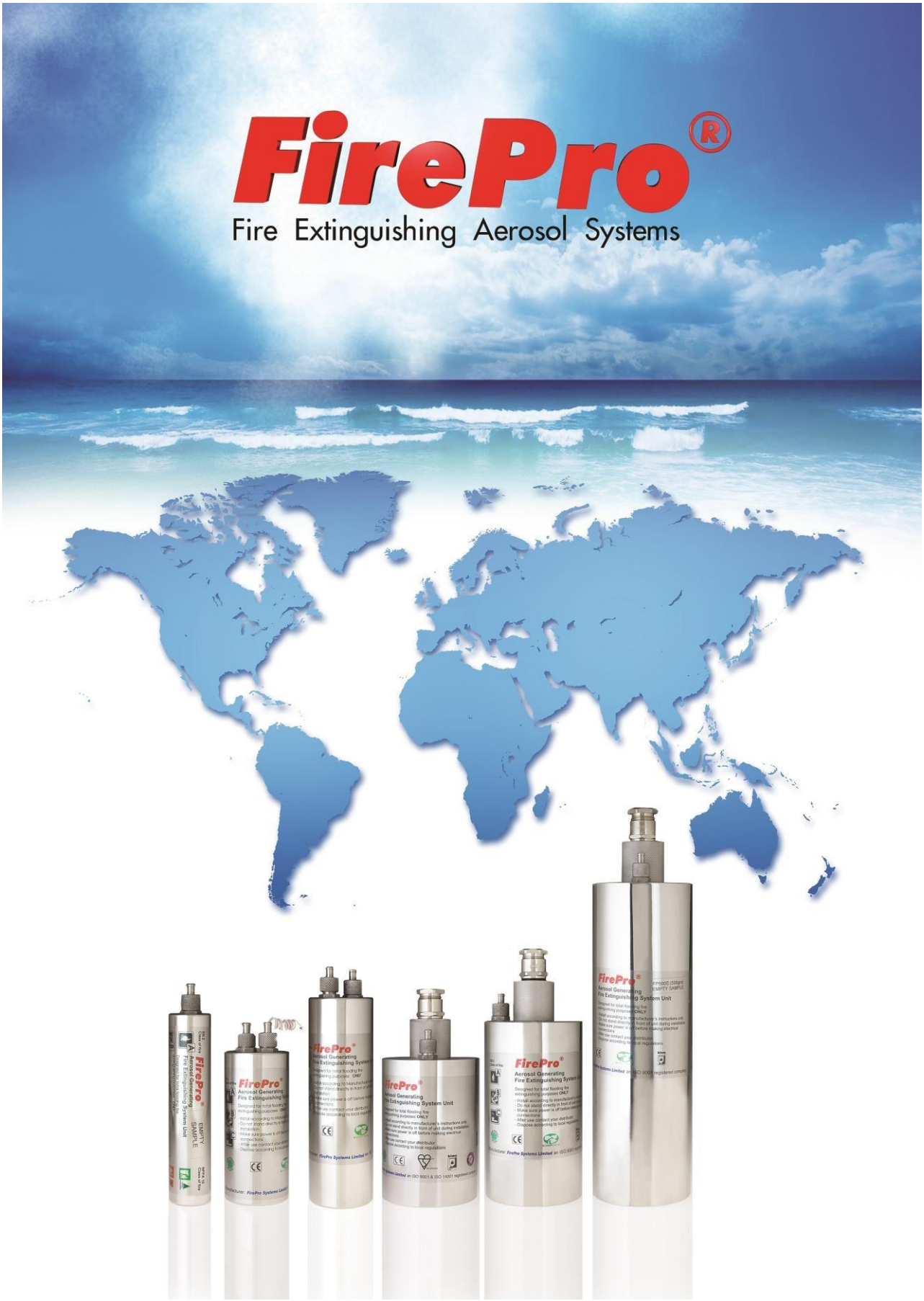
FirePro®

Fire Extinguishing Aerosol Systems



Potassium

Part of the solid compound of **FirePro®** consists of potassium. Potassium is a chemical element (a very soft metal with a silvery lustre).

- History and name

Potassium was first isolated by Davy in 1807 through the electrolysis of molten potassium hydroxide (KOH), from which the name potassium is derived (see also alkali). At roughly the same time (1807 – 1808) Gay-Lussac and Louis Jacques Thenard obtained the element through the reduction of molten potassium carbonate with iron filings in an iron crucible.

- Occurrence

With 2.59% potassium occupies seventh place in the list of most common elements in the earth's crust. In seawater it has an average concentration of 0.380 g per kg. It occurs in very many minerals and vegetable and living organisms (plants, animals, humans, etc, contain organic potassium salts).

- Properties

Potassium is an alkali metal. Apart from an inert gas configuration, the elements of this group, the alkali metals, have a single s electron that can easily be split off. Potassium consequently has a very simple, ionic chemistry.

- Physiological significance in the human body

While it is mainly sodium salts (in particular ordinary kitchen salt) that are dissolved in tissue fluid, no sodium is found in the cells, but potassium salts. The amount of potassium in the body is connected to the amount of sodium. Potassium has an important part to play in living organisms. Important sources of potassium in food are: vegetables, fruit, potatoes, meat, bread and milk. An adult needs approx. 3,500 mg of potassium per day.

Health, Safety & the Environment

FirePro® Aerosol does not damage property, may be used in the design concentrations in the presence of humans, and is environmentally and ecologically friendly.

FirePro® Aerosol is:

- Non Toxic (at design concentration)
- Non Conductive
- Non Oxygen Depleting
- Non Corrosive

FirePro® Has:

- Global Warming Potential (GWP) = 0
- Ozone Depletion Potential (ODP) = 0
- Negligible Atmospheric Life Time (solid active particles decay at a rate of 3% per minute)

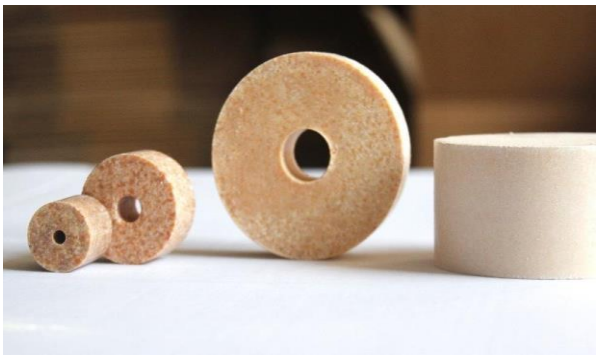
And:

- Does not affect the operation of equipment, in particular, electrical in nature.

Independent Test Reports from reputable Accredited Bodies and Institutions exist, supporting the above.

FirePro® SBK COMPOUND

NON PYROTECHNIC – Patented Technology



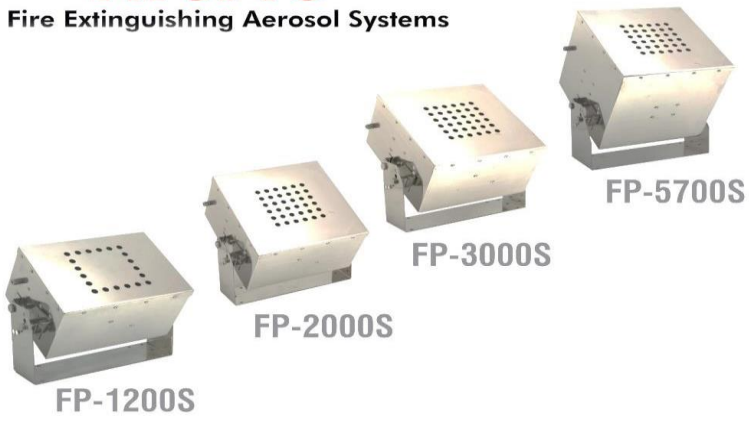
- Compact – strong solid
- Potassium salts
  (Key compound - K_2CO_3)
- Certified Life Time 15 Years
- Superior and stable performance
- Self-activation temperature 300 ˚C
- Non Toxic
- No chemical reaction with cooling material
- Principle of Activation:
  a. Thermal Energy
  b. Electrical Energy
- Transformation of Solid to Gaseous Aerosol phase

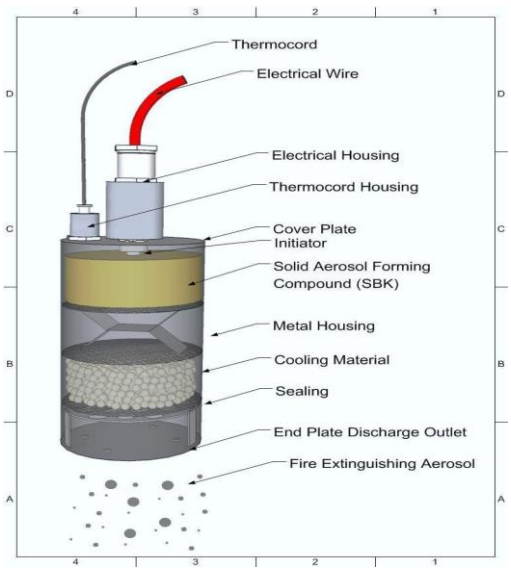
Main Advantages of *FirePro*®

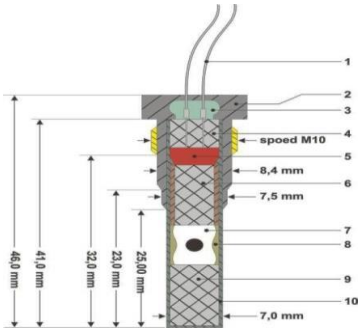
- Tremendous space saving, ie., the space required is only a fraction of the space needed for cylinders etc.
- Far easier installation - no piping, pressure cylinders, special supports or valves are required, thus reducing installation time and labour costs considerably.
- No pressure venting of enclosures necessary.
- Easy maintenance without the need for pressure testing, weighing, pressure/leak detection, filling, etc.
- Cost effectiveness - *FirePro*® systems are less expensive compared to most other gaseous systems making these more attractive to the end user.
- Employ the latest generation in SBK solid non-pyrotechnic compound.
- FirePro does not produce harmful toxic compounds or acidic fumes.
- Simple design calculations.

FirePro®

Fire Extinguishing Aerosol Systems





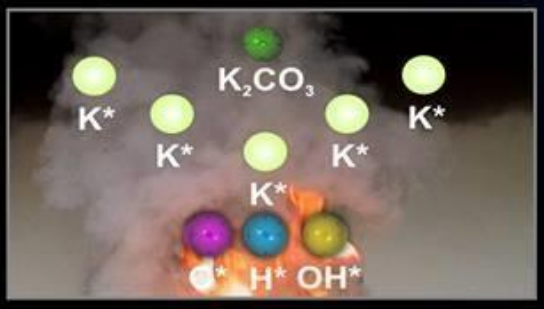


The FirePro® Principle

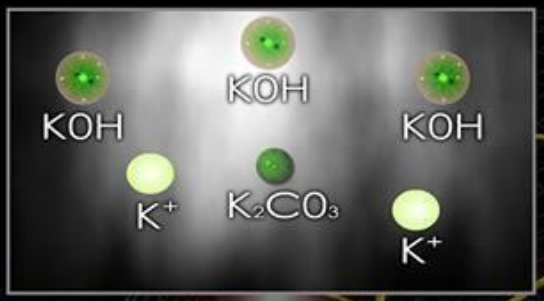
FIRE
Formation of radicals (O*, H*, OH*) during the chemical chain reactions of fire

Aerosol Phase I:
(before extinguishing process)
Inert gases (N_2, H_2O, CO_2) carrying solid, micro-sized particles (K_2CO_3)

Aerosol Phase II:
(during extinguishing process)
Formation of K* radicals by the disassociation of K_2CO_3



FIRE IS EXTINGUISHED
Reactions between radicals lead to the formation of stable compounds (KOH, K_2CO_3)



Comparisons between various fire fighting agents

	EFFECT ON HUMANS	EFFECT ON PROPERTY	EFFECT ON ENVIRONMENT
Foam and Water	When used in fixed systems it is necessary to have protection for humans	It may be corrosive due to large concentration of water and residue is harmful to delicate electronics	Residue can be difficult to dispose and foam can be poisonous
Water	Water is generally accepted as being not dangerous to humans when fighting fires	Can cause extensive damage to property	Can release harmful fumes and substances on extinguishment
CO_2	Highly dangerous to humans in fire fighting concentrations in enclosed spaces	Extinguishes fire cleanly but cooling effect causes condensation mist harmful to electronics	In general more CO_2 is released from other sources
Inert gases	May lead to inadequate oxygen supply to the brain when used alone	No damage caused	Naturally occurring components so do not pose a threat
Halon Halocarbons	Can be used in human presence but has been banned due to ozone depletion issues	No damage caused	Harmful to the environment
FirePro®	Can be used in human presence in designed concentration	No damage caused	Friendly to environment It is ozone friendly It is a Green Product

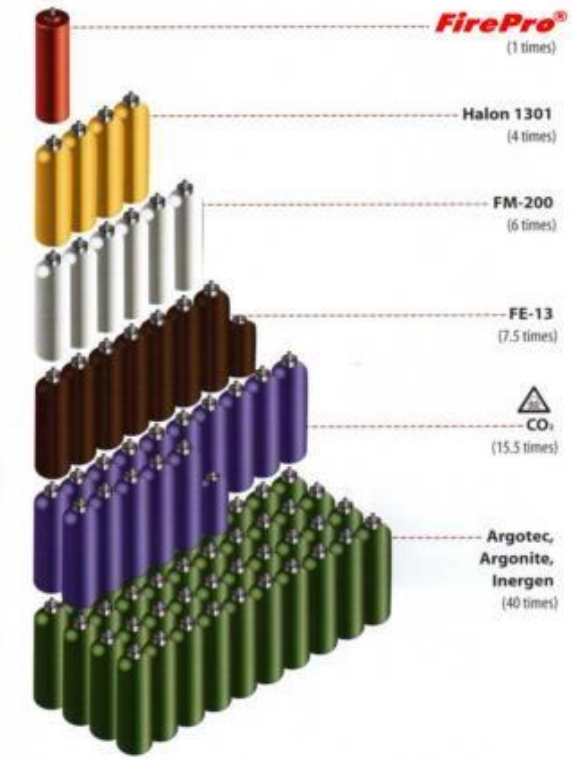
Comparison of the required quantity of:

FIRE PRO

vs

Traditional gaseous extinguishing agents

This characteristic allows great economy of space, and new methods of use.



Applications

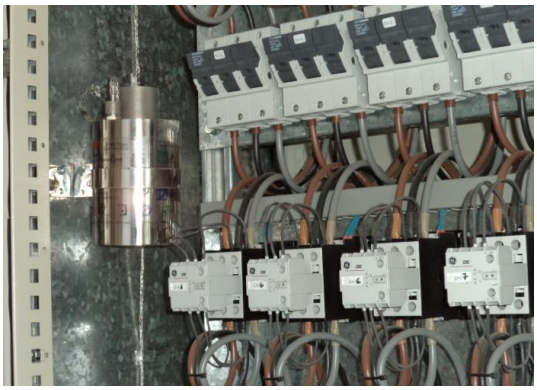
The range of ***FirePro***® products is wide and versatile to suit any application:

- Industry & Commerce, Banks, Offices
- Substations
- Server Rooms, Control Rooms, Data Centers
- Electrical Cabinets/Panels
- Transformer Rooms
- Warehouses, Archives
- DG Storage
- Public Transport
- Transport Vehicles
- Marine industry
- Oil Platforms
- Railways
- Wind turbines

Small Volumetric Enclosures

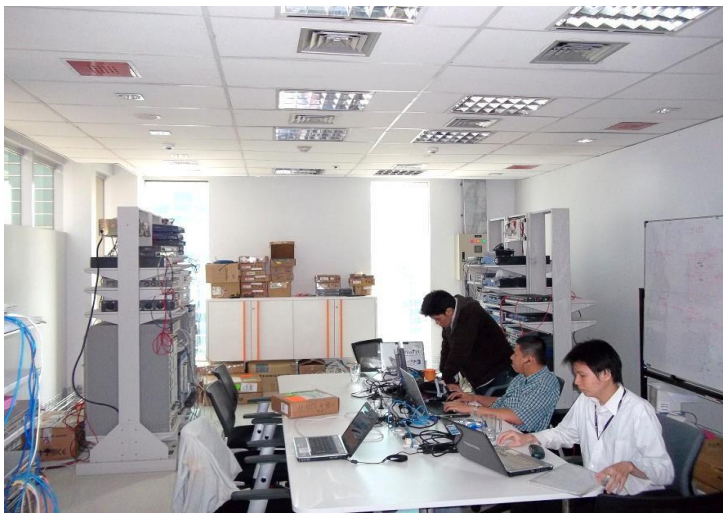
Source/Localised Extinguishing

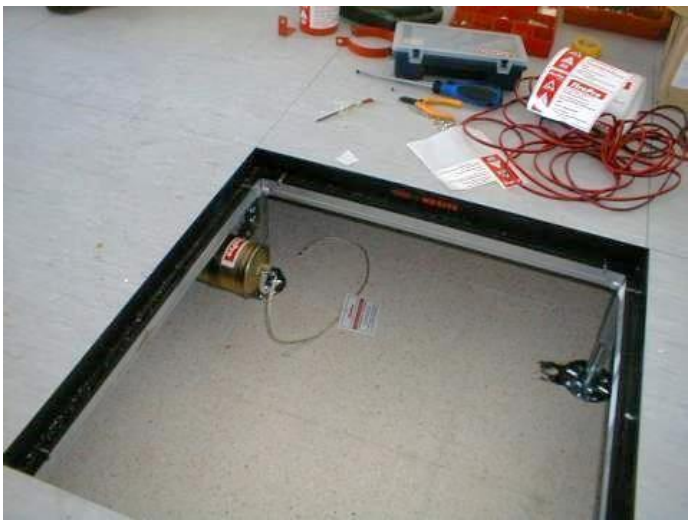
- Panel/Enclosure Protection
- Multiple Panel Enclosure Protection
- Special Applications/Projects



Medium Volumetric Enclosures

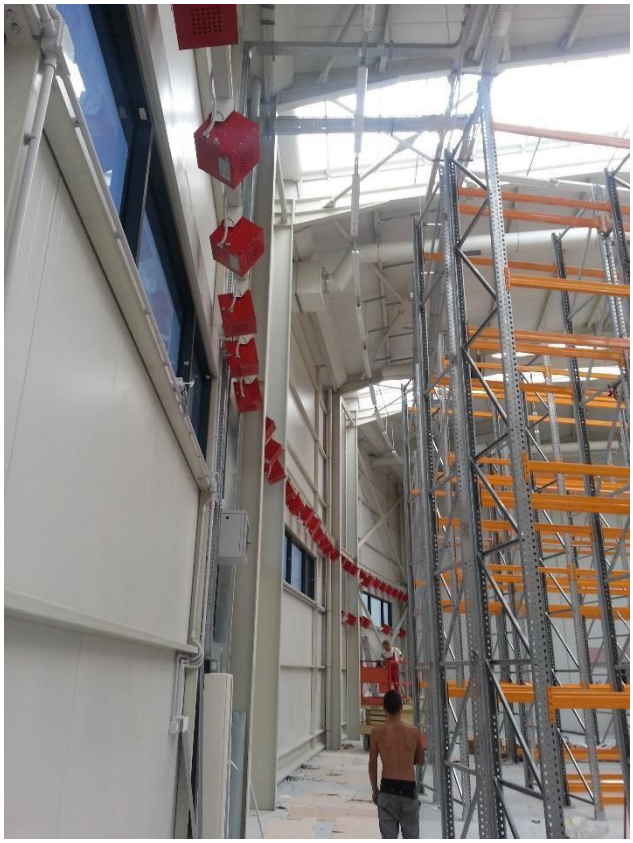
- Computer/Server Rooms
- Data Centers
- Electrical Rooms
- Control Rooms
- Special Applications/Projects





Large Volumetric Enclosures

- Substations/Control Room Protection
- Warehousing Protection
- Storage Areas
- Archives



Special Applications

- Vehicle Protection
- Heavy Machinery
- Railway Projects
- Marine Applications
- Offshore Oil Platforms
- Wind Turbine Protection
- Museums
- Historical Buildings

National and International Standards, Approval Notified Bodies and Listing Authorities on the “Condensed Aerosol Technology”

ISO – INTERNATIONAL STANDARDS ORGANISATION

ISO 15779:2011 – Condensed Aerosol Fire Extinguishing Systems - physical properties and system design

IMO - INTERNATIONAL MARITIME ORGANISATION

MSC/Circ.1270 4th June 2008 (revised MSC/Circ.1007 26 June 2001)

CEN - EUROPEAN COMMITTEE FOR STANDARDISATION

CEN/TR 15276-1/2, 2009
Before identified as: prEN 15276-1 and prEN 15276-2

U.S. EPA _ UNITED STATES ENVIRONEMENTAL PROTECTION AGENCY

Significant New Alternatives Policy (SNAP) Program

NFPA - NATIONAL FIRE PROTECTION ASSOCIATION

NFPA 2010 - Standard for Fixed Aerosol Fire Extinguishing Systems

UL - UNDERWRITERS LABORATORIES INC.

UL 2127 - Standard for Inert Gas Clean Agent Extinguishing System Units

UL 2775 - Standard for Fixed Condensed Aerosol Extinguishing System Units

KIWA (NETHERLANDS, EU)

BRL-K23001/02 October 20th 2003 edition

BSI - LICENSED

KM 547633

CE Mark

KFI (Korea) Korea Fire Institute of Industry and Technology

National Emergency Management Agency Notice No. 2012-160 (31/12/2012)


DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
Certificate No. 53413-2009-AQ-NLD-RvA
This is to certify that
FirePro®
FirePro Systems Limited/Celanova Ltd.
6 Koumandarias & Spyrou Araouzou Street,
Tonia Court No.2, 1st & 6th floor, 3720 Limassol, Cyprus.
has been found to conform to the Management System Standard:
NEN-EN-ISO 9001:2008
This Certificate is valid for the following product or service ranges:
Design, manufacturing, testing, selling, packaging, storing, distribution and assembly and installation of FirePro Fire Extinguishing Aerosol Generating systems in the widest sense of the word and the manufacturing of products used in combination with all models of FirePro Fire Extinguishing Aerosol Generators.
Initial Certification date: 15 December 2003
Place and date: Barendrecht, 22 December 2009
This Certificate is valid until: 15 December 2012
A. Donatz
Lead Auditor
Michiel van Alphen
Management Representative


CERTIFICATE OF COMPLIANCE
Certificate Number 20130129-EX6960
Report Reference EX6960-20110729
Issue Date 2013-JANUARY-29
Issued to: FIREPRO SYSTEMS LTD
6, KOUMANDARIAS STREET & SPYROU ARAOUZOU
TONIA COURT NO. 2, 1ST FLOOR 3036
54080 LIMASSOL CYPRUS
This is to certify that representative samples of: FIXED CONDENSED AEROSOL EXTINGUISHING SYSTEM UNITS
Pre-Engineered, FirePro Aerosol Generating Fire Extinguishing System Units, Models FP-20SE, FP-40S, FP-80S, FP-100S, FP-200S, FP-500S, FP-1200, FP-2000, FP-3000, FP-5700, with 20, 40, 80, 100, 200, 500, 1200, 2000, 3000, and 5700 grams respectively. The units have operating temperatures of -65°F (-54°C) to 130°F (54°C). The units are designed for total flooding protection against Class A, ordinary combustibles, Class B flammable liquid fires, with or without Class C involvement, occurring within an enclosure.
Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety: UL Subject 2775-Outline of Investigation for Fixed Condensed Aerosol Extinguishing System Units
Additional Information: See the UL Online Certifications Directory at www.ul.com/database for additional information
Only those products bearing the UL Listing Mark should be considered as being covered by UL's Listing and Follow-Up Service.
The UL Listing Mark generally includes the following elements: the symbol UL in a circle with the word "LISTED"; a control number (may be alphanumeric) assigned by UL; and the product category name (product identifier) as indicated in the appropriate UL Directory.
Look for the UL Listing Mark on the product.


Certificate
EC TYPE-EXAMINATION (MODULE B)
CERTIFICATE No. BSI/A.1/3.46/560436
Annex A1 Item: A.1/3.46 - Equivalent fixed gas fire extinguishing systems for machinery spaces (aerosol systems)
Product Type: Aerosol Fire Extinguishing System Units with dry condensed extinguishing agent, Fire Class A & B
Product Description: FP20S, FP40S, FP80S, FP100S, FP200S, FP500S, FP1200, FP2000, FP3000 & FP5700.
Specified Standard: IMO MSC/Circ.1007, MSC/Circ.1270
The attached schedule of approval forms part of this certificate.
First Issued: 20 August 2010
Date of Issue: 23 March 2012
Expiry date: 19 August 2015
For and on behalf of the BSI, a Notified Body for the above Directive
Notified Body Number 0086
Gary Fenton, Global Assurance Director
Sheet 1 of 9
raising standards worldwide™
BSI


Certificate
kiwa
Product certificate
Fixed fire extinguishing components based on dry condensed aerosol
Based on pre-certification tests as well as periodic inspections by Kiwa, the products referred to in this certificate and marked with the Kiwa-mark as indicated under 'Marking' may, on delivery, be relied upon to comply with the Kiwa evaluation guideline EIL-K23001, 2004-11-30 "Fixed fire extinguishing components based on dry condensed aerosol".
Bouke Monkman
Director Kiwa N.V.
This certificate is issued in accordance with the Kiwa Regulations for Product Certification.
This certificate consists of 5 pages.
Publication of the certificate is allowed.

FirePro®

Advantages/Characteristics

- Most Number of Certificates, Listings, Approvals Test Reports
- Non Pyrotechnic – Patented Technology
- Electrical and Thermal Activation – Solid to Gaseous Aerosol Phase
- Extinguishes Fire Chemically Without Removing Oxygen
- 'Total Flooding' Approach
- Easy Design Calculation
- Environmental & Eco Friendly
- No Corrosion
- No Effect On Equipment Operation
- Safe, Non Toxic
- No Pipework, Pressure Cylinders, No Filling
- Highly Space Saving, Much Lower Installation/Maintenance Costs/Time
- Solutions For Most Applications
- Worldwide Installations In Over 75 Countries

Listings - Product Certifications

UL LISTED

ACTIVFIRE LISTED

kiwa certified FIRESAFETY

ULC LISTED

ISO / Quality Management Certifications

ISO 9001 & 14001 DNV REGISTERED

ISO 9001 REGISTERED DNV MGMT. SYS. RvA C 024 DNV Certification BV

Marine Type Approvals

mca

ECB

RINA

DANISH MARITIME AUTHORITY

Inspectie Verkeer en Waterstaat

Sjøfartsdirektoratet Norwegian Maritime Directorate

www.firepro.info

CERTIFICATIONS

Patents of the Technology

Europäisches Patentamt / European Patent Office / Office européen des brevets

European Patent Office – European Patent no. 0925808

OPIC CIPO

Canadian Intellectual Property Office – Canadian Patent no. 2,250,325

Special Reports / Assessments / Type Approvals

CE

VROM

TNO

NLR

ANPI Brand- en Diefstalpreventie Prévention - Incendie et vol

LPC

HUGHES ASSOCIATES EUROPE, srl
FIRE SCIENCE & ENGINEERING