

Reinventing Fire Suppression

Welcome to the world of

FirePro.

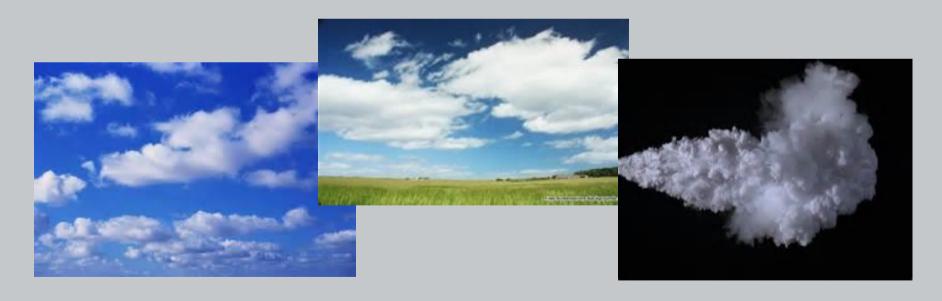
The global leading manufacturer of Condensed Aerosol Fire Extinguishing Technology



What is Aerosol?

Definition:

- Aerosol: A colloidal suspension of particles dispersed in air or gas(es)
- Colloids: Particles with diameter of a few microns nanometers



FirePro.

Company Profile

FirePro came to prominence in the fire fightin g industry, following the 1994 Montreal Protoc ol on ozone depleting substances that banned the use of Halon 1301 fire extinguishing agent - the universally accepted and most widely used at the time.



- FirePro Systems Ltd established in 1996
- HQ & Manufacturing Facilities in Cyprus

- Distributors in 75 countries
- Installations in 110 countries



Distribution Network

EUROPE

Albania Austria Belgium Bulgaria Croatia Cyprus Czech Rep. Denmark Estonia Finland France Greece Greenland Germany Hungary Georgia

Iceland

Ireland

Italy

Kosovo Luxembourg Malta Netherlands Norway Poland **Portugal** Romania Serbia Spain Sweden Switzerland Turkey **United Kingdom**

AMERICAS Argentina Brazil Canada Chile Colombia Ecuador Mexico Panama Peru Uruguay

U.S.A.

GULF & MIDDLE EAST Bahrain Iran Iraq Jordan Saudi Arabia Lebanon Oman Qatar Svria UAE

ASIA & **AUSTRALASIA** Australia Bangladesh **Hong Kong** India Indonesia Macau Malaysia New Zealand Papua New Guinea **Philippines** Singapore South Korea Taiwan Thailand

Vietnam

AFRICA Angola Egypt Kenya Morocco Nigeria South Africa Sudan Tunisia



Client Portfolio











Bloomberg







































FirePro.

Trade Mark & Technology Patents







Worldwide Trade Mark Registration No: 776689.

European Patent No: 0925808

Canadian Patent No: 2.250.325



Solid Aerosol Forming Compound (FPC)

- Compact strong solid
- Non-pyrotechnic
- Certified Lifetime 15 years
- Transformed into Aerosol upon activation (electrical or thermal)
- Exothermic transformation process
- Self-activation Temperature + 300 °C



FirePro.

Health Safety and Environment

Ozone Depletion Potential (ODP):
Zero (EPA-SNAP Listed)

Global Warming Potential (GWP): Zero

Atmospheric Lifetime (ATL): Negligible

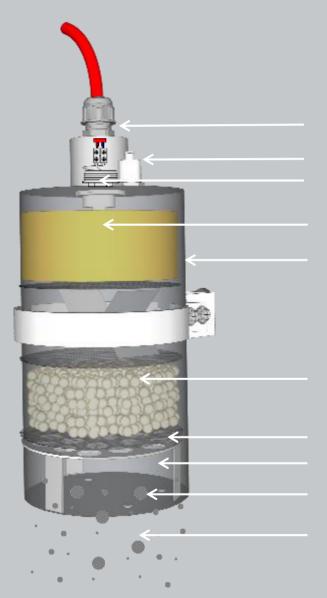
Oxygen Depletion:
None





Condensed Aerosol Generator





Electrical Activation

Thermal Activation Electrical Actuator

Solid Aerosol Forming Compound

Stainless Steel Metal Housing

Heat Absorbing Medium

Sealant

Egress Chamber

End Plate Discharge Outlet

Condensed Aerosol



Range of Products



FirePro.

Product Labels



Aerosol Generating Fire Extinguishing System Unit / Condensed Aerosol Generator





Class of fire

To be installed, inspected, maintained and tested in accordance with the Standards for Fixed Aerosol Fire Extinguishing Systems, NFPA 2010, ISO 15779 or CEN/TR15276-2

and in accordance with the:







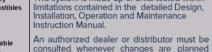












for the system or area of protection. An authorized dealer, distributor or installer must be consulted after discharge.

KM547633

This system is made up of units tested within

Operating temperatures from -65°F(-54°C) to +130°F(+54°C).

Inspection & Maintenance

At least semiannually, a visual inspection shall be conducted to assess the aerosol system's operational condition. At least annually, all systems shall be subjected to the manufacturer's test procedures by qualified personnel. During Inspection check the following components: electric wiring, electric contacts, fixing bolts and generator's casing.

Warning Discharge of agent can result in a potential hazard to personnel from natural form of agent. Avoid unnecessary exposure. Do not cover, remove or deface this label. Contents in solid form: Potassium Nitrate, Potassium Carbonate, Magnesium, Epoxy Resin Polymer.

H.M.I.S.: FPC Solids Compound 0-0-0

After Discharge or Replacement: Dispose of the aerosol generator properly after use.



















Manufactured by FirePro Systems Limited. An ISO 9001:2015 & 14001:2015 registered company. 6 Koumandarias Str., Tonia Court, 6th Floor, 3036 Limassol, CY Europe | Tel.: +357 25 379999

www.firepro.com





Product Labels



Condensed Aerosol Generators



EN 2 Class of fire



Surface burning fires



Flammable liquids

To be installed, inspected, maintained in accordance with the approved version of the Information, Instruction and User Manual of FirePro.

This system is made up of units tested within limitations contained in the approved version of the detailed Information, Instruction and User Manual of FirePro.

Condensed Aerosol Generators shall not be employed at less than the minimum thermal clearances as specified in the approved version of the Information, Instruction and User Manual of FirePro.

An authorized dealer or distributor must be consulted whenever changes are planned for the system or area of protection.An Authorized dealer, distributor or installer must be consulted after discharge.

Operating temperatures range: -30°C to +55°C.

Storage humidity: maximum 95% RH. Service Life: 15 years from date of manufacture

Inspection & Maintenance

At least semiannually, a visual inspection shall be conducted to assess the aerosol system's operational condition. At least annually, all systems shall be subjected to the manufacturer's test procedures by qualified personnel. During Inspection check the following components: electric wiring, electric contacts, fixing bolts and generator's casing.

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H.M.I.S.: FPC Solids Compound 0-0-0

After Using Dispose of the aerosol generator properly after use.

Manufactured by FirePro Systems Limited. An ISO 9001:2015 & 14001:2015 registered company. 8 Faleas Str., Agios Athanasios Industrial Area, 4041 Limassol, CY Europe I Tel.: +357 25 379999 www.firepro.com



CE SNAP









Certificates, Type Approvals and Test Reports



Condensed Aerosol Technology Standards:



Organization
International Organization
for Standardization
Standard
ISO 15779:2011



Organization
International Maritime
Organization
Standard
IMO: MSC.1/Circ.1270



Organization
European Committee
for Standardization
Standard
CEN/TR 15276



Organization
National Fire Protection
Association
Standard
NFPA 2010



Organization
UL - Underwriters
Laboratories INC.
Standard
UL 2775



Organization KIWA NV

Standard BRL-K23001/04



OrganizationStandards Australia

Standard AS 4487-2013



Organization
GOST - Russian
Quality Standards
Standard
GOST R 51046-97
Fire Engineering
Generators of
extinguishing aerosol



Organization
KFI - Korea
Fire Institute
Standard
Guideline for the Automatic
Condensed Aerosol
Fire Extinguisher



LPCB LISTING Cert/LPCB ref. 1417a

FirePro is the Only Condensed Aerosol Technology Certified According to LPS 1656 Standard on Condensed Aerosol Fire extinguishing Technology



- LPS 1656 draft is under final approval by BRE
- Box Type model listing
- At a later stage all cylindrical models will be included
- The FirePro Red Book Listing can be accessed directly on RedBook online directory through the following <u>Link</u>





FOR LAND APPLICATIONS:



Organization

UL - Underwriters Laboratories

Certification Protocol

UL 2775 – Fixed Condensed Aerosol Extinguishing Units

Reference

FWSA.EX6960



Organization

BSI - British Standards Institution

Certification Protocol

BRL-K23001/04 Aerosol Generating Fire Extinguishing System Units

Reference

Kitemark License Number KM 547633



Organization

ULC - Underwriters Laboratories of Canada

Certification Protocol

ULC/ORD-C2775-12 Fixed Condensed Aerosol Extinguishing Units

Reference

FWSAC.EX6960



Organization

KIWA NV

Certification Protocol

BRL-K23001/04 Aerosol Generating Fire Extinguishing System Units

Reference

Product Certificate K21774/16





FOR LAND APPLICATIONS:



Organization

CSIRO - Commonwealth Scientific & Industrial Research

Certification Protocol

AS 4487-2013 & UL 2775 Fixed Condensed Aerosol Extinguishing Units

Reference

ActivFire Certificate of Conformity afp-2286



Organization

CNBOP PIB - Scientific & Research Center for Fire Protection

Certification Protocol

CEN/TR 15276-1:2009 Condensed Aerosol Fire Extinguishing Systems

Reference

Certificate of Conformity NR. 4/2015



Organization

KFI - Korea Fire Institute

Certification Protocol

Guideline for the Automatic Condensed Aerosol Fire Extinguisher

Reference

Sogong 15-23-1



Organization

GOST (ΓΟCT) - Russian Quality Standards

Protocol

GOST R 51046-97 Fire Engineering
- Generators of extinguishing
aerosol **Reference**GOST TP 1389534



Organization

Global Mark

Certification Protocol

AS 4487-2013 Condensed aerosol fire extinguishing systems

Reference

42783209BA28F38FCA257F5B 00152E55



FOR MARINE APPLICATIONS:

MED Approval (Wheelmark)



Organization:

British Standards Institution

Type:

Certification Body

Country:

International

Description:

Wheel Mark in Compliance with MED 2014/90/EU

Reference:

BSI/A.1/3.46/560436 Module B & BSI/MED/PC/560437 Module D



FirePro technology Listings & Approvals FOR MARINE APPLICATIONS:

Type Approvals by IACS Members



Organization

ABS - American Bureau Of Shipping **Certification Protocol** IMO MSC.1/Circ.1270 -UL 2775



Organization

BV - Bureau Veritas **Certification Protocol** IMO MSC.1/Circ.1270



Organization

RS - Russian Maritime Register of Shipping **Certification Protocol** IMO MSC.1/Circ.1270



Organization

RINA
Registro Italiano Navale
Certification Protocol
IMO MSC.1/Circ.1270





FOR MARINE APPLICATIONS:

Local Marine Approvals



Organization
Danish Maritime
Authority
Reference
Type Approval Certificate 19992
5855



Organization
European Certification
Bureau B.V.
Reference
Certificate of Compliance
No. 15031995



Organization
United Kingdom Maritime
& Coastguard Agency
Reference
Certificate of Inspection
& Test MS 22/3/910



Organization
Australian
Marine Safety
Reference
TE: AFP 07 09 23 ltr



Organization Hellenic Register of Shipping Reference 4232/9



Organization
Netherlands Shipping
Inspectorate
Reference
IVW-06KU00014



Organization
Icelandic Maritime
Administration
Reference
506.001.02



Organization
Swedish Maritime
Administration
Reference
070202-04-15563



Organization Norwegian Maritime Authority Reference 200416148-9/556



Organization
New Zealand
Register of Ships
Reference
CSM 07020-03



SNAP Program Listing

U.S. Environmental Protection Agency (EPA)



- FirePro is considered to be ozone friendly as it contains no CFC's
- SNAP Listed as Halon alternative:
 (Significant New Alternative Policy by EPA)

"Protection of Stratospheric Ozone:

Listing of Substitutes for Ozone-depleting Substances/Fire Suppression and Explosion Protection

Direct Final Rule/Acceptable Substitute:

Powdered Aerosol E (FirePro)"



Green Label Certificate



Organization: GEN (Global Eco-labelling Network)

(GEN) is a non-profit making association.

Their standards address multiple environmental criteria across the **life cycle** of a product or service and, most importantly, they are transparent in their development process and employ **independent, third-party verification.**



ISO 9001:2015 and ISO 14001:2015 Certified









CE Marking Certified



Conformité Européenne





Safety Integrity Level (SIL)

- FirePro is the only condensed aerosol manufacturer that has passed the Safety integrity level attested by TUV.
- The global importance of SIL grew substantially in the transportation industry the last 10 years.
- FirePro generators are found to be in compliance with the requirements of:
- SIL 2 with Hardware Fault Tolerance = 0
- SIL 3 with Hardware Fault Tolerance = 1
- SIL is an indicator of probability that a system will fail to perform properly, thus a third-party certification is requested for Risk Management / Insurance purposes.





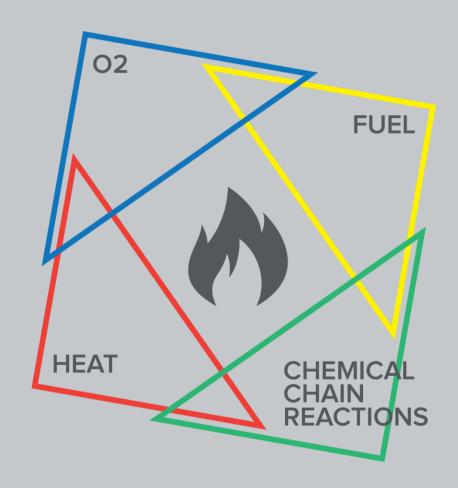


Aerosol

Fire Extinguishing Action



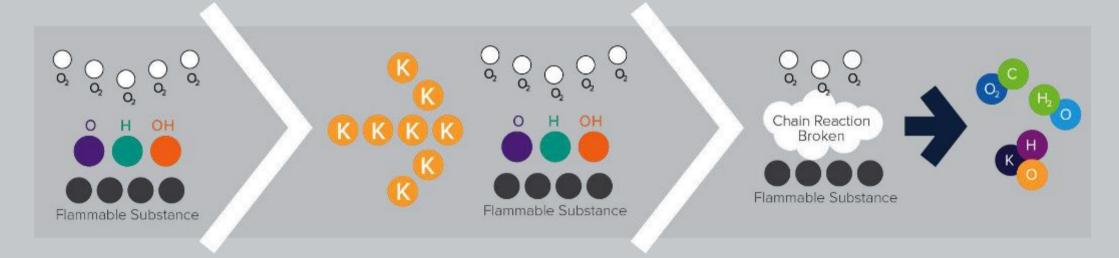
Tetrahedron of Fire



FirePro.

FirePro is **Effective** & Efficient

Fire Extinguishing Action:



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

Formation of Potassium free radicals

K+ (radicals) react with fire free radicals (OH, O, H) Formation of Potassium Hydroxide

KOH react with CO2 to form Potassium Carbonate

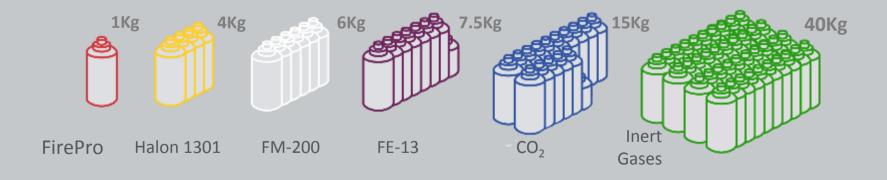


FirePro – Effective & Efficient

Agent Mass Comparison:

- 4x more efficient than Halon 1301
- 6x more efficient than FM-200
- 7.5x more efficient than FE-13

- 15.5x more efficient than CO₂
- 40x more efficient than inert gases







FirePro: NO Storage – NO Pipes – NO Pressure





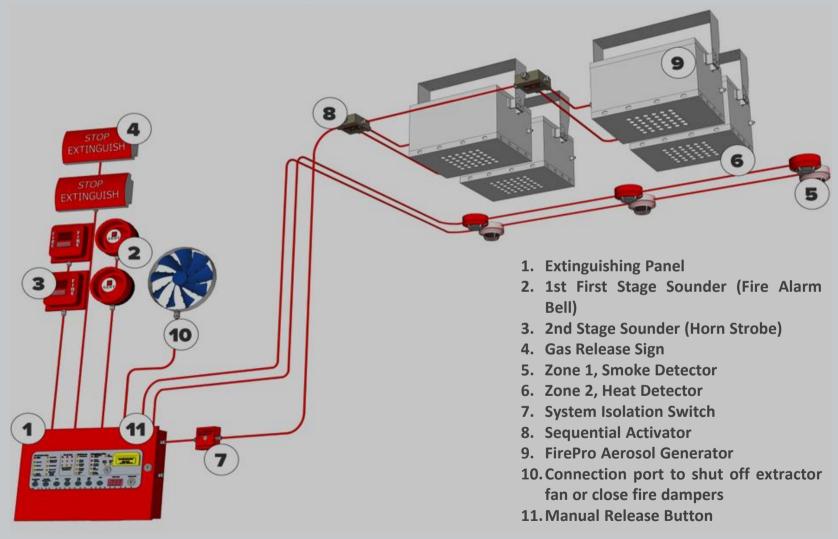
Total Flooding Design

&

System Operation



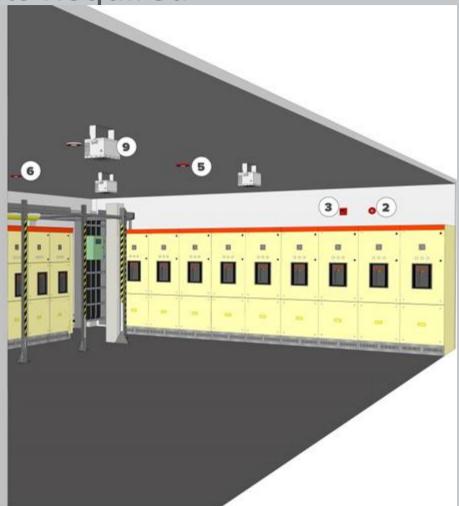
Basic System Components Required





Basic System Components Required





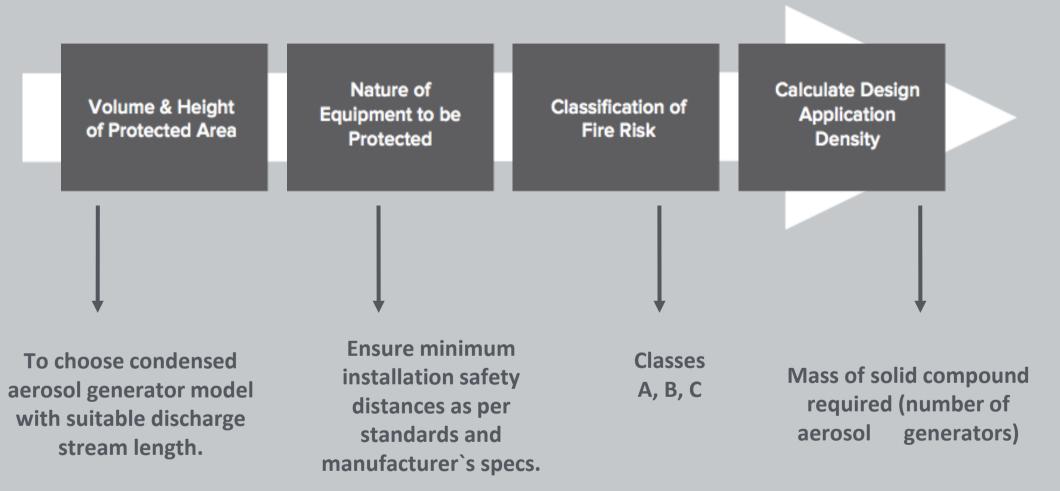
- 1. Extinguishing Panel
- 2. 1st Stage Sounder (Bell)
- 3. 2nd Stage Sounder (Horn Strobe)
- 4. Gas Release Sign

- 5. Smoke Detector (Zone 1)
- 6. Heat Detector (Zone 2)
- 7. System Isolation Switch
- 8. Sequential Activator

- 9. Aerosol Generator



Design Approach



FirePro.

Design Principle (EN Standards)

Land Applications

 $M = V \times D \times S.F$

M (g) = Mass of Aerosol forming compound

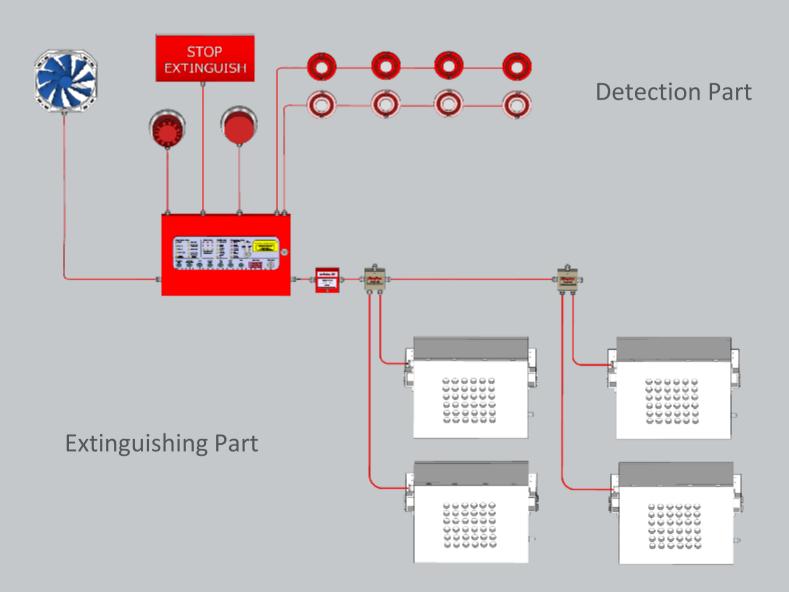
V (m³) = Protected Volume

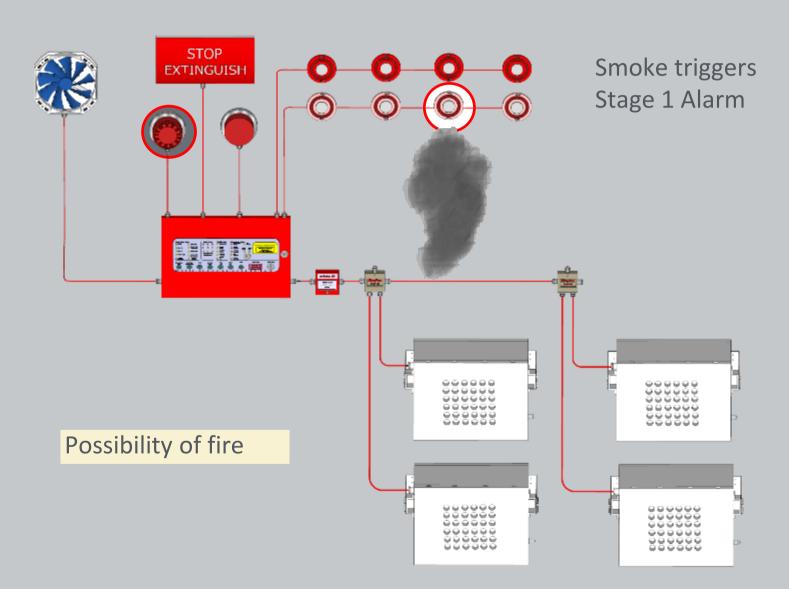
 $D(g/m^3) = Extinguishing Application Density (EAD)$

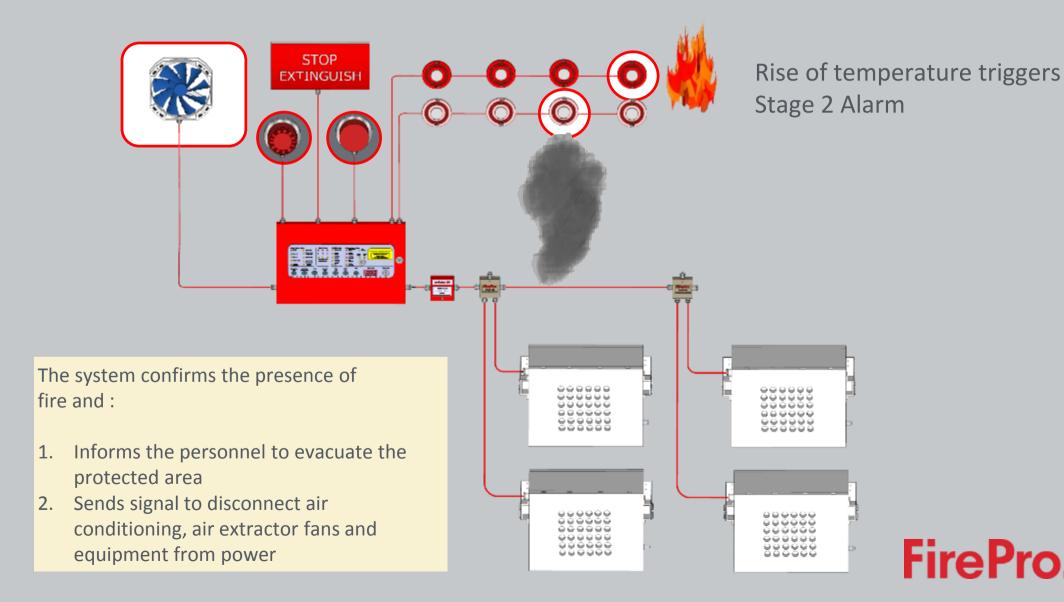
SF = Safety Factor (30%)

Fire Class	E.A.D. EN (g/m³)
А	76.4
В	55.4
С	49.8

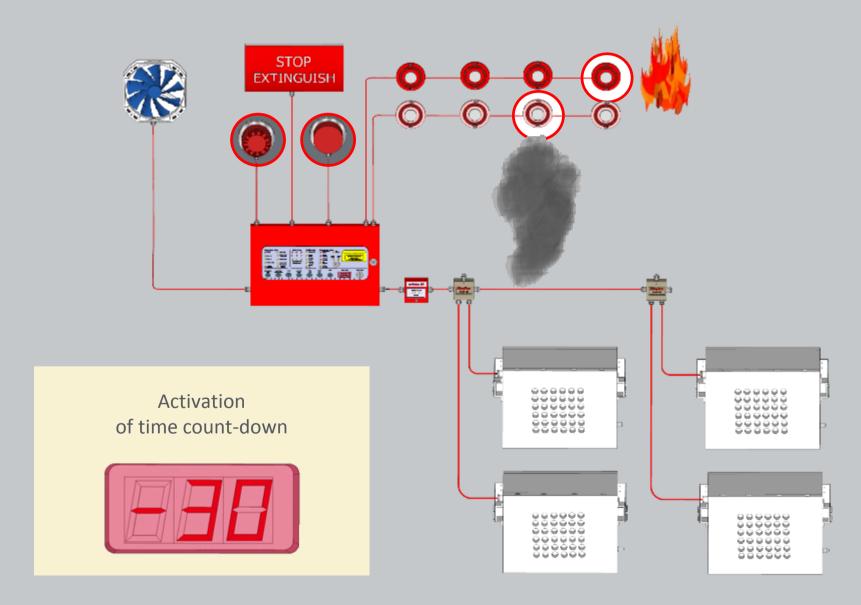


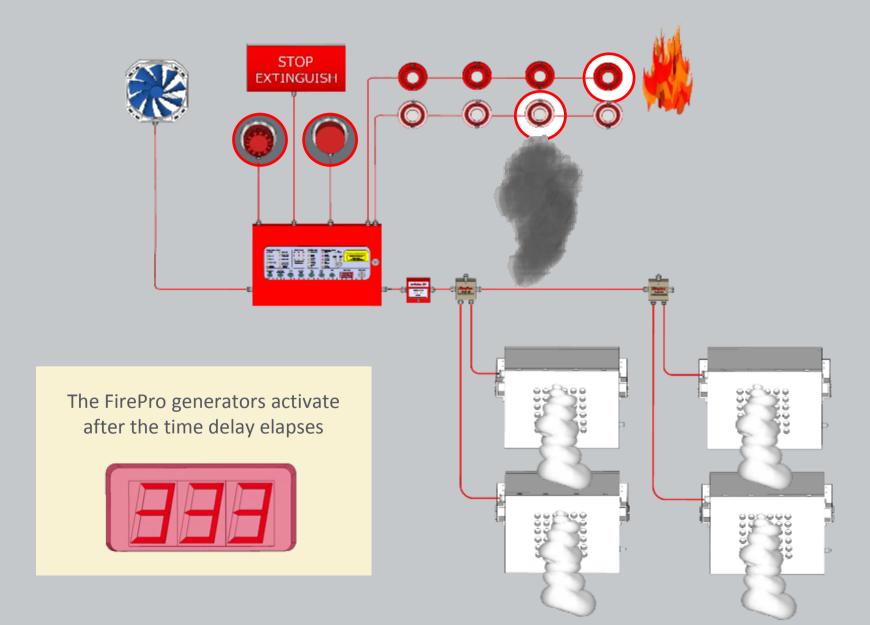












Modular Controllers: FPC-4R

Model	FPC-4R(M)
Battery	3V (internal) or 24V (external)
Detection	LHD
Monitoring	NO
Output Signals	YES (2)
No. of Generators	2 maximum

Where it can be used?

- Electrical panels
- Engine bays



Large Enclosures (Kentec Panel)

Model	Sigma XT / Sigma A-XT
Battery	24V (internal)
Detection	Automatic Detectors
Installed	External
Monitoring	YES
Output Signals	Various
No. of Generators	40 maximum (up to 360 master/slave)
Re-usability	YES
Listings	UL / EN



Where it can be used?

In large room enclosure(s)





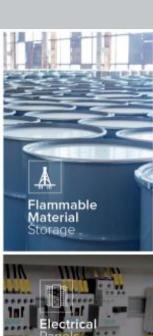
Applications & References



Applications

- Archives
- Cable Tunnels
- False Ceilings
- Raised Floors
- Wind Turbines
- Inverters
- Power Packs
- Electrical Panels
- Main DistributionBoards
- Switchgear
- Power FactorCorrection
- Control Rooms
- Electrical Rooms
- Transformer Rooms
- Telecom Shelters
- Diesel GeneratorRooms

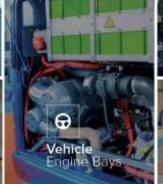
- Marine Engine Rooms
- Vehicle Engine Bays
- Heavy Vehicle Engines
- Railway Stations
- Rolling Stock
- Medical Equipment
- Processing Areas
- Pumps Rooms
- Boilers Rooms
- Chillers Rooms
- Burners Rooms
- Compressors Rooms
- Machine Tools
- Kitchen Hoods
- Bank Vaults
- Dangerous Goods
- First Responders
- Storage Areas
- Laboratory Rooms













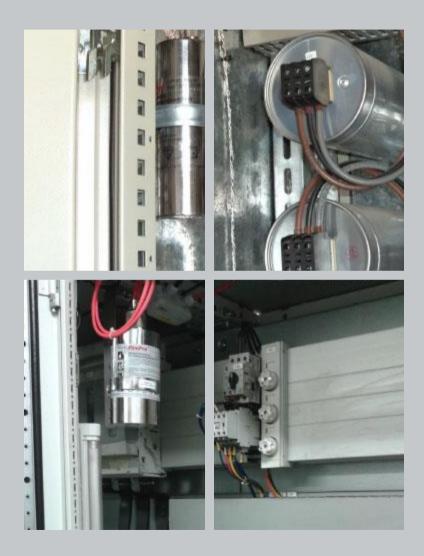








Electrical Cabinets



Electrical Panels:

Egypt Suez and Kattameya – Ital Cementi Cement plants









FirePro.

Control Panels: Solar Park South Korea



500MW Power Station - Siemens

Cooperation between PGCIL & Bangladesh. Location: Bheramara















Battery Packs: Containers South Korea







UPS and Battery Rooms: ICAP UK









FirePro.

Control and Battery Rooms: Eurostar UK









Substations: Electricity Authority Cyprus









HV/LV Rooms: Chelsea & Westminster Hospital, UK



Storage & Archives





VROM NETHERLANDS









FINANCIAL INSTITUTIONS, CYPRUS

TELECOM ROMANIA





Princess Elisabeth Research Station, Antarctica



FirePro.

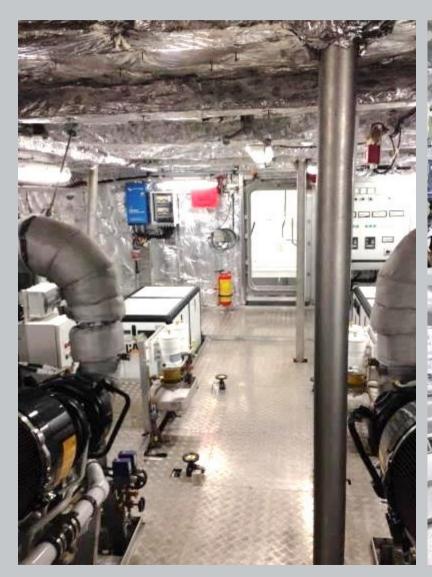
Wind Turbines: South Korea



Marine Applications



Marine Applications







Military Applications (Land – Sea)







Egyptian LNG (ELNG) - Liquefied Natural Gas Facilities

Location: Africa

Dealer: Watania Advanced Systems

 Application: UPS Rooms, Control Rooms, Electrical Panels







Perenco – European Oil & Gas Company

Location: Africa

Dealer: Protecta Tunisie

Application: Electrical Rooms

Industry: Oil & Gas







FirePro.

Offshore Oil Platforms









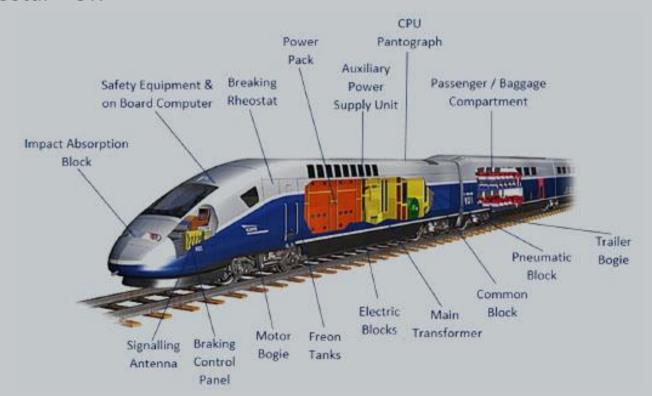
Kardex Storage Systems: Dubai International Airport



International Railway Projects

- Hungarian Railway Company
- Indian Railways
- Trenitalia
- TCDD Railways Turkey
- Eurostar UK

- Polish National Railways
- Prorail Dutch Railways
- CAF Spain
- São Paolo Metro Brazil







Real Fire Incidents



- The condenser in the PFCU exploded initiating a fire
- The PFCU was Not Protected with FirePro Units
- The Fire brigade's action ultimately contained the fire
- However the damage caused is clearly seen







Electrical Cabinets that "were" Fire Proof!





Exploding Condenser in Power Factor Connection Units



Successful Extinguishing of a potentially destructive fire in one of the Largest Steel Mills in Korea, **POSCOSS**.



POSCO is the largest Steel Manufacturer in Korea, ranked within the 5 largest Steel Manufacturers in the world.



- FirePro FP-3000 model installed in the control room of the 100 ton overhead crane, handling the melting furnace of the Steel Mill.
- Due to electrical fault, a fire developed in the control room and was immediately extinguished by the FirePro unit.
- POSCO decided to protect all its overhead cranes and risky areas with FirePro.

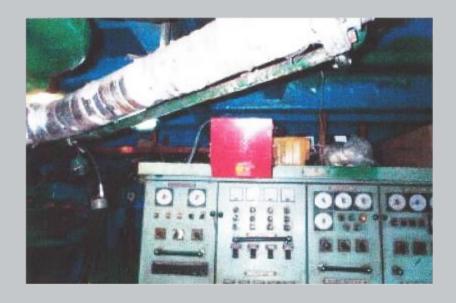


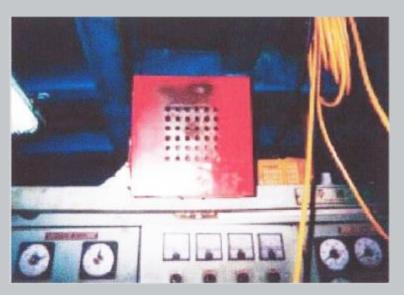


Marine Reference in Korea:

Vessel Name & Registry: No. 35 Kangdong, Chugmu of Korea Rep.

- 69 Tons, Fishery Vessel
- 2 x FP 3000 units were installed in the engine room in 2005
- Fire occurred in the vessel's engine room during voyage on the 25th of Feb. 2006
- FirePro System was successfully activated extinguishing the fire at it's initial stage preventing it from spreading and causing further damages.









- FirePro extinguished a starting fire and prevented a large fire which may have caused possibly several millions of Euros of damages.
- At the complex concerned,
 14 companies are located
 and there are working 750
 people.

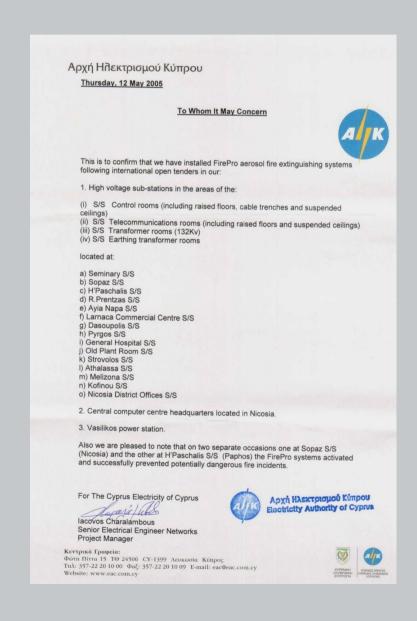


Boiler room



EAC Reference:

"We are pleased to note that on two separate occasions, one at Sopaz (Nicosia) and the other at H'Paschalis (Paphos) the FirePro systems activated and successfully prevented potentially dangerous fire incidents."







Summary



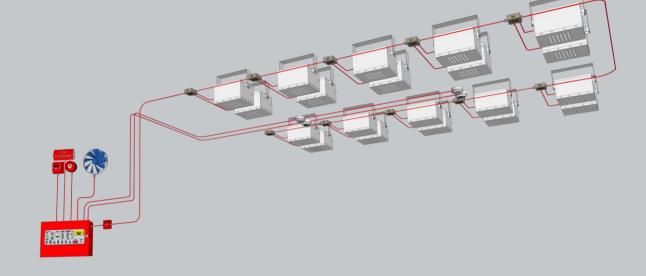
Technology Advantages

For the Designer

- Simple design
- Modular
- Fail Safe System
- Feasible to protect risks that previously were not possible

For the Client

- No Agent Storage Space needed
- No pressure tests required
- 15 years lifetime
- Safe for Humans & Environment



For the Installer

- No pressure integrity tests
- Simple & Fast installation
- No Piping



Awards



Organization:

Skydd & Säkerhet Security Awards

Location:

Stockholm, Sweden EU

Designation:

New Product Introduction

Date:

October, 2015



Organization:

SICUR International

Location:

Madrid, Spain EU

Designation:

New Product Introduction

Date:

March, 2012



Organization:

CCCI Federation

Location:

Nicosia, Cyprus EU

Designation:

Manufacturing Sector

Date:

February, 2012



Organization:

British Standards Institute

Location:

Birmingham, England EU

Designation:

BSI Kitemark

Date:

February, 2009



Organization:

XVII FISP, FISST & VIII Fire Show

Location:

Sao Paulo, Brazil

Designation:

Most Innovative Technology

Date:

August, 2008



Organization:

HISWA Holland Marine

Industry

Location:

Amsterdam, Holland EU

Designation:

Most Innovative Product

Date:

March, 2002



Why Condensed Aerosol Technology



Technology



Cost-Effective



Environment



Choosing FirePro

- ✓ Environmentally Friendly
- ✓ Global Presence
- ✓ Installations in 110 countries
- ✓ Complies with the best Global Standards
- ✓ Non Pyrotechnic Compound
- ✓ Prestigious Client Database and References





Certified 15-year shelf-life



CFC-free



Non-Oxygen Depleting



HFC-free



Halon Alternative



Zero Ozone Depletion Potential



Non-Pressurized



Zero Global Warming Potential

