

### Stat-X® Aero-K®

Stat-X is a new name for the old Aero-K products. These products are one of the first aerosol forming compounds based on pyrotechnical materials, developed in Russia.

Aero-K had difficulties to enter the market. Now they try it again with another name and look.



Aero-K



Stat-X

### FirePro®

**FirePro®** is the trade mark of FirePro Systems Ltd., a Cyprus based International Group, which owns the International Patent of the technology, developed after many years of research and development by a group of international scientists. The technology is derived by the old Russian technology, with a different and improved chemical composition, which does not contain any pyrotechnic material neither in the solid compound composition nor in the cooling material composition.

**FirePro®** is the most widely certified, approved and listed aerosol system.



#### A)- Classification of the product under the “ Dangerous Goods Regulations” codes:

**Stat-X:** Class 1.4S



(Articles explosive, n.o.s.), pyrotechnical for technical purposes

75% Potassium Nitrate  
16.5% Dicyandiamide (Cyanoguanidine)  
8.5% Organic Resin

**FirePro:** Class 9.1



(Miscellaneous, solid, n.o.s.), aviation regulated solid material.

77% Potassium Nitrate  
4.0% Potassium Carbonate  
19% Epoxy Resin

According to the information mentioned in the attached MSDS, Stat-X is classified as a pyrotechnic material. Important disadvantages related to pyrotechnic materials are: instability versus temperature increase, decay of its mechanical properties with the time, reduced life time and as a consequence loss of efficiency.

### B)- Aerosol Forming Compound:

**Stat-X:** the appearance of the compound (as per photos attached) is of a white solid material, which is very fragile and disassociate with a simple touch into a powder thus its mechanical stability and strength is very low. The chemical composition is of pyrotechnic nature, as indicated in the MSDS, and is classified as Class 1.4S (Articles explosive, n.o.s.), pyrotechnical for technical purposes.



**Thus it is subject to all the disadvantages related to pyrotechnic materials. The life time (shelf life) declared by the Manufacturer is 10 years, although similar pyrotechnic materials do not exceed 5 years life time.**

**FirePro®:** the appearance of the compound is of a off-white – beige color indicating various color shades of the different ingredients in the composition, which is solid and of strong consistency; it brakes into large pieces only if subjected to a strong pressure, thus it is of strong mechanical stability and strength. The mechanical stability and strength are vital factors for aerosol generator units, which may be subjected to vibrations and shocks in certain applications.



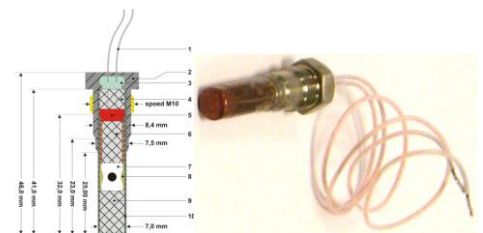
**The chemical composition, is non pyrotechnic, as indicated in the MSDS, and is classified as Class 9.1 (Miscellaneous, solid, n.o.s. no otherwise specified), aviation regulated solid material. Thus it is not subject to the disadvantages related to pyrotechnic materials; its life time (certified) is minimum 15 years.**

### C)- Igniter-activator:

**Stat-X:** from the photos taken after opening a Stat-X generator, the Stat-X electrical activator is made of an ignition material of pyrotechnic nature (similar to an ignition match), which is enclosed into a primitive textile bag containing the ignition compound in powder form.



**FirePro®:** the electrical activator is made of a simple and reliable heat element enclosed inside a steel metal housing, which contains the aerosol compound in solid form.



**It is therefore evident the drastic difference between the two activators: it is easy to expect that Stat-X activator is subject to all the disadvantages related to pyrotechnic materials, i.e. instability versus the temperature increase, decay of its mechanical properties with the time, reduced life time and as a consequence loss of reliability. Additionally it is expected that the Stat-X activator made of a textile bag may have some mechanical deficiencies in relation to vibrations, shock resistance, etc.**

**D) - Cooling system:**

**Stat-X:** a chemical material based on activated alumina.

The heat absorption is derived by a chemical reaction between the aerosol chemical components and the cooling chemical material. Many by products may be derived by such chemical reactions, which are not indicated in any chemical analysis. The only chemical analysis on the discharged aerosol composition are referred to a document issued by a Russian Institute (not accredited internationally) in 1991.

**It is quite unusual that an American Manufacturer supplies a product for so many years and use only a report on the chemical nature of the product, issued more than 17 years ago and by a Russian non accredited laboratory.**



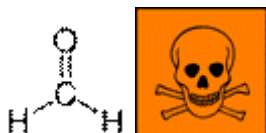
**FirePro®:** a natural heat absorbing material (ceramic type).

The heat absorption is derived by a physical reaction and the heat is exchanged without involving any chemical reaction, thus without changing the chemical composition of the discharged aerosol. The chemical composition of the discharged aerosol has been analyzed by accredited Institutes, such as KEMA, and it is clearly indicated in the KEMA Report.

**E) – Polymeric resin (binding material):**

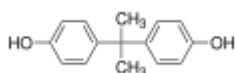
**Stat-X:** a chemical material based on **Formaldehyde, Phenol Polymer** (CAS number 9003-35-4, as indicated in Stat-X MSDS).

More information is available in the following web site: <http://en.wikipedia.org/wiki/Formaldehyde>

**Safety (extract):**

Formaldehyde is classified as a probable human carcinogen by the U.S. Environmental Protection Agency. The International Agency for Research on Cancer (IARC) has determined that there is "sufficient evidence" that occupational exposure to formaldehyde causes nasopharyngeal cancer in humans.<sup>[19]</sup> The United States Environmental Protection Agency USEPA allows no more than 0.016 ppm formaldehyde in the air in new buildings constructed for that agency.<sup>[20]</sup> On April 11th, 2008, FEMA announced that all trailers purchased by that agency in the future must meet the same standard.<sup>[21]</sup>

**FirePro®:** a chemical material based on **Bisphenol A**, commonly abbreviated as **BPA**, an organic compound with two phenol functional groups (CAS number 25068-38-6, as indicated in FirePro® MSDS).



More information is available in the following web site: <http://www.ccohs.ca>

The Canadian Centre for Occupational Health & Safety, one of the most stringent Organizations on safety assessments.

**Safety (extract):**

The International Agency for Research on Cancer (IARC) has concluded that this chemical is not classifiable as to its carcinogenicity to humans (Group 3).

The American Conference of Governmental Industrial Hygienists (ACGIH) has no listing for this chemical.

The US National Toxicology Program (NTP) has not listed this chemical in its report on carcinogens.

**F) – Aerosol phase toxicity and corrosion assessment by accredited Institutes:**

**Stat-X:** The Manufacturer refers to tests conducted in Russia in 1991 and to tests by accredited Laboratories in USA, but no precise indication to which laboratories; no toxicological test Reports are submitted with the documentation. It is expected that in the Stat-X gas phase are presents toxic gases such as NO<sub>x</sub>, NH<sub>3</sub>, HCN Hydrogen Cyanide (which are derived by the decomposition of the Dicyandiamide contained in the solid compound, as referred to in the document issued by IPCS-International Program on Chemical Safety and the Commission of the European Communities available at [www.inchem.org/documents/icsc/icsc/eics0650.htm](http://www.inchem.org/documents/icsc/icsc/eics0650.htm)), while the solid particulate, as indicated by the Manufacturer, contains NH<sub>4</sub>HCO<sub>3</sub> (Ammonium Hydrogen Carbonate) at 23.2 % of the total quantity. This substance, as indicated in the NIOSH chemical safety card, is toxic.

**FOR STAT-X THERE IS NO REPORT OF ACCREDITED LABORATORY.**

**FirePro®:** Many tests have been conducted by accredited laboratories and the Reports are available from the Manufacturer. Specifically the KEMA Institute has carried out a very detailed series of analysis (See Kema Report) on toxicity, and TNO has tested the impact on electronics for a period of 15 months (See TNO Report). The NLR (Dutch Aerospace Laboratories) has lately tested the corrosion on metals (See NLR Report), with positive results. The Ministry of Environment, member of the European Union Eco-Labeling Board (EUEB) has listed FirePro as an environmentally friendly product and authorized the green label marking.

**F) – Certifications**

**Stat-X:** The list of Certifications and Listings is limited to few marine type approvals (for small yachts) and to the UL/ULC listing.

**FirePro®:** The list of Certifications and Listings has reached an impressive number (68) and includes European Listings (KIWA, ANPI), UL, ULC (Underwriters Laboratories, USA/Canada), BSI (British Standards Institute), Fire Brigades Authorities, Shipping Inspectorates (large vessels), Ministries, etc. (See list of Certifications).

For this purpose FirePro Systems has employed the services of the foremost name in fire protection engineering consultancy, Hughes Associates, Inc. Baltimore (HAI)/Hughes Associates Europe, srl (HAE) Italy.



HAI with its staff of professionals have conducted and are continuing to do so, experimental research, development and testing for the military, federal and commercial/industrial fire issues in the USA and around the world. They are the fire risks consultants of the US Coast Guards, Pentagon, US Navy, US Government, etc.

HAI is currently supporting **FirePro®** to undergo further international certifications, develop scientific issues, and many more specific services. It has already finalised its major “Due Diligence Audit Report on Certifications Record” showing in the words of HAI that:

“The certifications and reports owned by **FirePro®** demonstrate that the characteristics of the product/technology are consistent with the most stringent environmental requirements stated by the international regulatory bodies.

The approvals on applications obtained from several Authorities proves the **FirePro®** capability to comply with the specific requirements and the reports on performance testing demonstrate the repeatability and consistency of result on testing run by different Authorities and Laboratories in many different countries, giving a high level of credibility to the data published by the manufacturer.

The **FirePro®** quality assessment certifications issued by different Authorities are also giving a consistent reliability on the manufacturing process standards.”



### G) – Fire class

**Stat-X:** fire class



**FirePro®:** fire class



### H) – Project References

**Stat-X:** References of real projects are an indication of how well the Markets accepts a product/technology. Not many prestigious projects are indicated by the Stat-X Manufacturer. In addition the few projects are of small size and related to protection of small enclosures.

**FirePro®:** References of real projects are available and cover small, medium and large enclosures (thousands of cubic meters), including a list of impressive International Clients (Ministries, Insurance companies, Electricity Authorities, Philips, Coca Cola, Sheraton, Hilton, Vodafone, Orange telecom, Central Banks, Petrochemical Groups, etc).

**Disclaimer:** All above information are derived by public documents and technical data issued by each Manufacturer.