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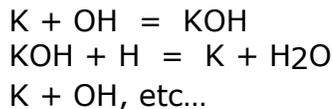
## EQUIPMENT EXPOSURE ISSUES FOR *Stat-X* AEROSOL GENERATORS

*Stat-X* aerosol has been tested on a wide range of materials including structural, aviation composites, and materials commonly used in electronics, and circuit boards. In all cases it has been shown that *Stat-X* has no deleterious effect on the operating capability of equipment.<sup>123</sup>

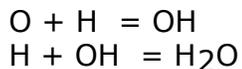
### EXTINGUISHING MECHANISM

"Fire propagation" radicals (OH, H, and O) are essential elements in the propagation of the fire. *Stat-X* suppresses the fire (primarily) by chemical interference with these free radicals within the fire zone – thus interrupting the on-going fire reaction.

Potassium radicals (K) are the main active component of *Stat-X* aerosol. They are very active and react with these "propagation radicals" – much like the bromine radicals did in Halons. The chemical reaction may be represented as follows, for example:



In addition, the flame propagation radicals recombine on the surface area of the ultra-fine aerosol particulate to further interfere with flame propagation:



### AEROSOL CHARACTERISTICS

Due to the ultra-fine particle size and the method of generation, the particulate is quite buoyant and suspends in the gas/air mixture within the protected enclosure. Because of this "buoyant" effect the aerosol does not begin to "settle" for an extended period and, therefore, is extremely easy to vent from the protected area. Only very minor amounts of particulate may be deposited on equipment and, generally, there is no need to do anything beyond extraction of the air within the protected volume through a fan or air handling system – followed by a blow down with compressed air. Any

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<sup>1</sup> Findings, Study of Gas Aerosol Fire Extinguishing Compounds on Structural Materials, Maximov, Babkin, Samokhvalova, Report of Metall Company 1991.

<sup>2</sup> Findings, Corrosive Effect of Gas Aerosol Fire Extinguishing Compounds on Structural Materials in Aviation Technology, Leonova G.P., Usankova L.A., Report of All Union Scientific Research Institute for Aviation Materials 1991

<sup>3</sup> Findings, Effect of Gas Aerosol Fire Extinguishing Compounds on Electronic Equipment, Karelin V.G., Antonov, B.I., Scientific Industrial Organization Energia, 1991



particulate deposited on horizontal surfaces will be  $\leq 2\mu\text{m}$  and will not form a continuous layer. Large gaps will exist between particles - leaving no potential for electrical conductivity issues to develop.

As a precautionary measure, however, it is always good practice to inspect and clean the site thoroughly following a discharge. While the aerosol itself is quite "clean", environmental factors are also a consideration. The unknown, and potentially harmful, by-products of an actual fire pose the biggest risk to sensitive electronic equipment. Because unknown products from the fire itself may be present, it is always recommended that equipment be blown down with air or vacuumed following a discharge to insure that no unwanted by-products from the fire itself are present.

Unlike HFC's, which can break down and produce deleterious compounds such as hydrofluoric acid when exposed to the high heat of a fire, *Stat-X* does not break down when exposed to a fire and quickly extinguishes by means of chemical interference with the flame's free radicals. *Stat-X* has been approved by the United States Environmental Agency (EPA) and approved for use under the EPA's Significant New Alternatives Program (SNAP).<sup>4</sup>

#### ***Stat-X* AEROSOL COMPOSITION<sup>5</sup>**

*Stat-X* aerosol consists of a gas (30%) and solid particulate (70%) mixture. Mean dimensions of aerosol particulate are in the range of 1-2  $\mu\text{m}$ . The aerosol consists of the following, primarily, potassium compounds (% mass 90 seconds after discharge) and carrier gases:

<b><u>Compound: (particulate)</u></b>	<b><u>% Original Mass</u></b>
Particulate captured within generator housing during discharge/cooling	30.00
K <sub>2</sub> CO <sub>3</sub>	22.08
KHCO <sub>3</sub>	3.280
KNO <sub>2</sub>	3.160
Other potassium compounds	2.200
NH <sub>4</sub> HCO <sub>3</sub>	9.280
<b><u>Compound: (gas carrier)</u></b>	
N <sub>2</sub>	21.93
H <sub>2</sub> O	6.550
CO <sub>2</sub>	1.361
CO	0.097
NH <sub>3</sub>	0.041
NO	0.001
NO <sub>2</sub>	0.002
HCN	0.006
Other	Trace
<b><u>Total</u></b>	<b><u>100.00</u></b>

<sup>4</sup> Authorization letter from US EPA, 2004

<sup>5</sup> 100 ft<sup>3</sup> tank testing of *Stat-X* Fire Suppressant Units, Talley Defense Systems, 1999



## SUMMARY

*Stat-X* aerosol has been tested on a wide range of sensitive materials including real world industrial applications. There have been no reports of any negative effects of the aerosol composition on electronic equipment or circuit boards. Properly installed *Stat-X* systems will not harm electronic equipment and there will be no detrimental affect to the effective life of equipment exposed to *Stat-X* aerosol.



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