



## CHLORIDE CONTAMINATION

Regenisys Limited  
 Unit G, 20 Cain Road  
 PO Box 12 498  
 Penrose  
 Auckland  
 P +64 9 579 0321  
 F +64 9 579 0323  
 admin@regenisys.co.nz  
 www.regenisys.co.nz

### Given the right circumstances chloride can become extremely corrosive.

In everyday use, chloride is usually found bound harmlessly within the chemical structure of polyvinyl chloride (PVC), a commonly used plastic found in electrical cabling, electronic equipment, wallpaper, telephones, floor tiles and many other everyday items. However, this common everyday use item is converted to hydrogen chloride gas when it is burned, then when water is added, either as a direct liquid or as a result of high relative humidity, the hydrogen chloride forms hydrochloric acid, an exceptionally corrosive and volatile liquid.

A background level of chloride is always present on all surfaces, arriving in the air as an extremely fine dust of sodium chloride produced by the evaporation of sea-spray. Newly manufactured surfaces can have less than 0.1µg/sqcm (micrograms per square centimetre) of chloride, but environmental contamination over time will raise this to 3-5µg/sqcm, a level which is considered normal.

Gold, platinum and tantalum are among the few metals that are completely resistant to hydrochloric acid. However, the common metals used to make electronic office equipment; steel, stainless steel, chromium plating, nickel, brass and aluminium are all readily attacked. Chloride contamination of surfaces may be in the form of hydrochloric acid or one or more of a range of chloride salts of metals, notably sodium chloride (common salt), calcium chloride or the chloride of the metal concerned, which is produced by corrosion of the metal after contact with hydrochloric acid.

Following a fire, contamination with hydrochloric acid that raises the chloride level to 10µg/sqcm is enough to initiate corrosion on exposed metals. This corrosion will become severe at 20-30µg/sqcm, and rapid ongoing corrosion will occur at levels greater than 50µg/sqcm.

- At >5 µg/sqcm, electronic equipment should be decontaminated to ensure longevity and reliability.
- At >10 µg/sqcm, electronic equipment requires decontamination to eliminate any possibility of short to medium term functional failure and to ensure longevity and reliability. As long as the effected equipment is stored in a controlled environment, decontamination can be deferred for several weeks.
- At >20µg/sqcm, electronic equipment requires prompt attention to remove the contamination.
- At 50-100µg/sqcm, electronic equipment must be decontaminated immediately.

*If the total time of exposure can be limited to no more than a few hours, concentrations of 200-300µg/sqcm can still be successfully removed from electronics.*

Since the probable level of sodium chloride salt originally present on everyday items is relatively low, the simplest and most reliable measure of the severity of contamination, in terms of the risk or active speed of corrosion of metals and staining of plastics, is the measure of the total quantity of chloride in the forms of acid and salts per unit surface area. There is usually a direct relationship between the strength of the smoke odour from affected surfaces, and the level of chloride contamination which can be quickly and cost effectively qualified using a propriety "Quick Test" strip.