

The Dust Story:

Why are electronics vulnerable to moisture & high humidity?

Public Enemy #1

The cooling fan

Close-up of fan showing heavy deposits of dust.

Dust deposits

Dust deposits throughout the interior of the chassis. and/or cooling electronic components by the electrical interior of the chassis.

Most electronic equipment has cooling fans vents. These provide a stream of air to cool components against the severe build-up of heat generation. Over time, these fans draw dust into electronics. This fine dust may be heavy or light-throughout the printed circuit cards, components

After a disaster such as fire or flood, water and moisture may come into direct contact with computers, phone systems, medical electronics, etc. Additionally, the relative humidity may be high due to water released from fire fighting, burst pipes, or weather elements from an open roof. The dust immediately absorbs this moisture even if the equipment is not directly impacted by the water. Without this dust, the moisture would not adhere as readily to the surfaces of the electronics.

This **moisture** begins to corrode the electronic components on the printed circuit cards causing short circuiting and damage.

Additionally, if powered on, **galvanic** or **electrolytic** corrosion ensues. This occurs when electricity flows through the corrosion. It may be because the device is powered on, or if the equipment has a battery such as a PC does for time and date, the battery will supply electricity. This corrosion resembles the corrosion on the terminals of a car battery.

The Dust Story: cont'd

Left unmitigated, the circuit cards will begin to corrode and may produce intermittent failures. These failures can be very hard to diagnose and may result in lost data, computer failure and network problems. In equipment such as a phone system, the result may be static sound and noise when listening to a call, lost voicemail and so forth.

Other types of electronics such as CNC control systems in machinery, medical electronics and office equipment are equally as vulnerable to this type of damage.

Mitigation

Recognizing that high humidity may be as damaging as direct water contact, the first step is to begin immediate de-humidification of the premises. Next, if practical, remove the equipment to a dry location until relative humidity is established and maintained at no more than 45% R.H. until premises mitigation is completed. Equipment should be opened and inspected, and recovery procedures performed. These should include:

- 1) **Thorough removal of all dust through disassembly and cleaning.**
- 2) **Next, any rust or corrosion must be completely removed.**
- 3) **The subassemblies should then be dried in environmental ovens for 1-2 hours at 50 degrees Centigrade.**
- 4) **Lastly, the units should be reassembled and evaluated for the additional necessity of any repairs.**