

Marketing Bulletin

Seagate Sustainability in Action

Good environmental stewardship goes beyond just being “green”

Overview

Seagate has received recent inquiries from some of our customers regarding potential circuit board failure modes caused by bromine contamination. It appears that one or more of our competitor's products are failing at an alarming rate due to this issue.

We at Seagate want to assure our customers this is not an issue with our drives because of our green design and patented drive components.

Our focus on the environment goes beyond mere compliance to environmental initiatives; it also focuses on providing an overall business sustainability value proposition to our customers.

The Issue in Summary

Bromine is a material from the halogen family. The term “halogen” means salt-former. Salt-formers ionize readily and form conductive residues. As halogens, bromine and chlorine are prime candidates for the formation of ionic contamination, a well-known hazard to printed circuit board field reliability.

Bromine-containing materials, when exposed to elevated temperatures, have the potential to convert to a gaseous form and subsequently form as a precipitate on circuit boards, where they can pose a corrosive hazard. In this circumstance, the bromine contamination can eventually corrode critical electrical components and circuitry to the point of failure.

Customers have inquired about this issue, specifically with respect to the threat of out-gassing contamination from the acoustic foam commonly used in hard drives, and some have reported competitor drive failures associated with a bromide residue from the foam that corrodes key components on the electronics. As of 2008, Seagate no longer uses acoustic foam in our 3.5-inch drives due to advancements in drive acoustics. However, we want to ensure our customers that when used in previous generations and 2.5-inch products, our foam is halogen free and therefore not a source for bromide contamination.

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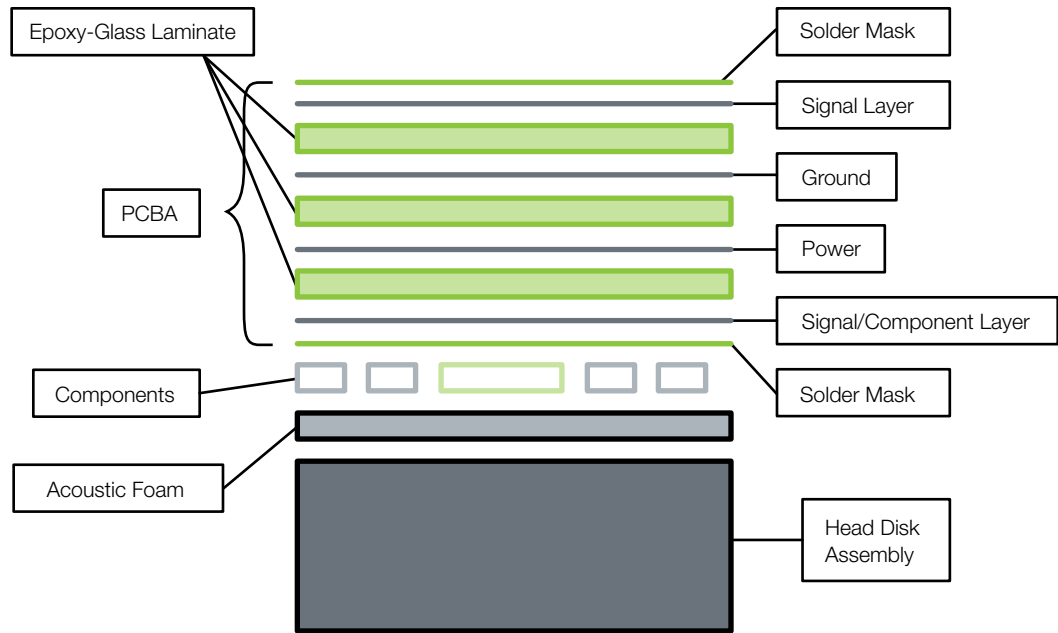


Diagram not to scale

Figure 1. Seagate patented insulator design

The Patented Design Approach From Seagate

At Seagate, our hard drives employ a patented version of this acoustics insulator that not only provides quieter-performing hard drives, but also efficiently transfers heat from the electronics through the foam to the top cover of the drive, which also serves as a heat sink. The Seagate design actually utilizes two different foam materials simultaneously. One is standard foam used over areas of the electronics that do not exceed a specific temperature. The other foam is made of a super heat-conductive material that is positioned over the hottest-running electrical components. This material is specifically engineered to effectively transfer heat without the risk of out-gassing. The end result has proven to help Seagate drives run cooler with improved reliability.

While the original acoustic foam design from Seagate did contain some bromine content, it has shown to be molecularly locked in the foam material and not at risk of out-gassing. Furthermore, our newest generation of hard drives (including our acoustic foam) has moved to

low-halogen designs which virtually eliminate the potential for failure modes related to bromine or other halogen-related contaminant failures.

Also, improvements in the acoustic performance of 3.5-inch drives allowed Seagate to remove acoustic foam altogether beginning in 2008. When no acoustic foam is present, thermal interface material (TIM) is applied directly to the component package in liquid form, then cured. In some products, thermal interface material has also been removed in conditions where it is not needed.

Although recent reports point to acoustic foam as the source for bromide contamination, it is not the only place in which bromide can be found. Seagate has strengthened the reliability and sustainability of our drives by making many of our products available halogen- and bromide-free, thus eliminating the possibility of bromide contamination and the resulting drive failure. By offering an eco-friendly design, we are better suited to ensure product integrity, reliability and sustainability for a truly green drive.

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Conclusion

As the industry's largest and oldest hard drive manufacturer, Seagate understands the challenges associated with maintaining our reputation as the industry leader in quality and reliability, and this remains our top commitment to our customers.

We also understand that our customers depend on us to consistently provide dependable, quality supply to sustain their business models as part of the Seagate comprehensive sustainability commitment:

- Lead the industry in the development of products that reduce the environmental impact of our products through low-power designs, recycling and active participation in nonmetal initiatives, such as ROHS compliance and halogen-free, brominated flame retardant-free and PVC-free materials.
- Develop packaging designs focused on improving recyclability, and reduce size and weight to optimize transportation costs.

- Use vertical integration to optimize supply chain management, minimize scrap impacts and provide best-in-class supply availability to our customers.
- Use Six Sigma Quality and Reliability discipline to minimize the risk of field failures that could cause supply disruption and customer quality problems.
- Innovate on storage technologies in cooperation with customers and industry long-term planning opportunities.

Seagate product development, manufacturing and distribution incorporate the guiding principles of environmental and economic sustainability. Achieving our business sustainability program goals means that customers can count on a safe supply of industry-leading storage solutions with a complete value proposition around performance, quality, reliability and environmental stewardship.