

Research for the NSF 426 Task Groups - Environmental Leadership Standard for Servers

Contracted by:	International Sustainable Development Foundation (ISDF) in cooperation with the Green Electronics Council (GEC)
Research Conducted by:	Sea Green Tree S.L (catriona.mcalister@seagreentree.com) and Hansheng Ltd (anson.wu@hansheng.co.uk)
Task:	#3 – The Presence of Mercury in Servers
Research Question:	<p>The TG 6 – Substances of Concern – is debating the applicability of a criterion on non-mercury containing lamps. The specific questions are:</p> <ol style="list-style-type: none"> 1) Is mercury present in servers? 2) If yes, where? And how prevalent (always, sometimes, rarely, etc.)? 3) Are LCD screens found in servers, what function do they serve and if found, how prevalent are these screens in server products? 4) If present, do the LCD screens typically contain mercury-based lamps or mercury-free technology (e.g., LED)? 5) And if present, would these LCD screens be inside the chassis of the server (related to the definition of “product” within the scope of the standard)? <p>The key question – should the standard include a criterion specifying that “Products shall not contain lamps with intentionally added mercury”?</p>

Research Response:

Definitions

- CFL – Compact Fluorescent lamp. A type of backlight used for LCD displays. These often contain mercury, although there are some types which do not.
- CMOS battery – A battery used to power the BIOS memory and clock of the computer when powered off.
- LED – Light emitting diode. A type of backlight used for LCD displays.
- LCD - Liquid crystal display. A type of flatscreen display technology.
- KVM – Keyboard, Video, Mouse. A system to connect and control many computers over the same KVM.
- RAID – Redundant Array of Independent Disk. A method of combining hard disks to provide additional performance and resilience. This is usually an additional controller in the server and requires a backup battery to ensure the data is safely written to the hard drive if power is suddenly lost.

Summary

This research confirms the statements already made by industry regarding mercury in servers.

Is mercury present in servers?

Analysis of publicly disclosed information suggests no mercury is present, in particular in batteries used for CMOS backup, and RAID cache.

Public information disclosure could be improved by stating definitively if mercury is present or not.

Are LCD screens found in servers, what function do they serve if found, and how prevalent are they?

LCD screens can be found on most blade enclosures, and larger 4-socket servers. It is estimated that screens are available on under 25% of servers by model, but by sales this is likely to be much lower. The LCD screens are used for server management.

Do screens contain mercury backlights?

No evidence of mercury backlights was found in integrated server displays.

Are the screens within the definition of the product?

The screens without mercury are integrated in the chassis of the product and are within the definition. Other discrete displays used in conjunction with servers may contain mercury but are outside the product definition.

Should there be a criterion specifying products shall not contain lamps with intentionally added mercury?

Based upon our understanding of current server design, a criterion specifying that products shall not contain lamps with intentionally added mercury is not likely to result in any changes in server design, or any environmental savings.

Inclusion of such a criterion would be an insurance against the (low) possibility of servers containing mercury in future, as displays may become more prevalent. It may assist in formalising the documentation of the lack of mercury in servers. If a criterion were to be introduced, an alternative form could be: “Servers shall not contain mercury, including lamps with intentionally added mercury, and shall include a definitive statement that no mercury is present in the relevant product documentation”.

Mercury in servers in general

Whilst eco-declarations would be expected to provide clear information on mercury content in servers, they in fact cross reference to whether the product meets regulatory requirements. Such requirements have exemptions for mercury in lamps and batteries. A similar situation also exists for lead (Pb). Therefore, eco-declarations are not sufficient to demonstrate the absence of mercury or compliance with any new server standard.

HP server disassembly instructions¹ state more clearly that no parts of the server contain mercury. Although this only covers one manufacturer, it is likely all the other manufacturers have similar components. Additional research, concentrating on the CMOS batteries and RAID backup battery for a number of different servers models and manufacturers suggests these are chromium and li-ion batteries and therefore do not contain mercury.

Server LCD displays and mercury

Integrated displays

Displays on rackmount servers are not common. They tend to be restricted to premium servers with 4 or more socket and blade enclosures where the additional complexity warrants the additional manageability functions. This means, in the range of approximately eight rackmount servers per manufacturer only one or two will have a display - less than 25% based on number of models and likely to be far lower based on server units sold. However, it is possible that LCD displays could become more common on basic servers as technology flows down.

For most servers these are small, simple monochrome displays only a few inches in size which appear to be electroluminescent or LED frontlit and therefore do not contain mercury. Blade enclosures have larger displays but these are also monochrome.

Rackmount monitors

Rackmount monitors and KVMs are pullout interfaces used to connect directly to a server. These have large colour screens, generally 15-19” and sometimes use CFL backlights. They are therefore more likely to contain mercury. However, since these are discrete pieces of equipment and do not provide any remote processing or data capabilities these would not fall under the server product definition and are out of scope.

Criteria for mercury in servers

There is no evidence that mercury is used in servers. Therefore general criteria or criteria for screens are unlikely to impact current models since current displays are not backlit. In the near future, if LCD displays

¹ <http://www.hp.com/hpinfo/globalcitizenship/environment/productdata/disassemblyservers.html>

are more common, and/or use higher pixel colour screens, a backlight may be used. However, the general market trend towards LED backlights means this may not be a problem.

Because mercury is not clearly disclosed under current eco declarations, clearer disclosure of mercury within the server, however, may be valuable over the long term to ensure that mercury does not become a problem and simplify future criteria development.