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ISA Standard 71.04 Changes Approved for the Protection of Today's Electronic Equipment – First Update in 25 Years

DORAVILLE, GA – More than 25 years since its original publication, one of the most widely used industrial standards for the protection of electronic equipment, ANSI/ISA-71.04, has been updated and approved as an American National Standard. This revision was prompted due to reliability issues manufacturers have been experiencing since the passage and implementation of a number of RoHS^[1], or lead-free, regulations.

“The [International Society of Automation \(ISA\)](#) Standard 71.04-2013: *Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants* has been long due for an update,” says Chris Muller, Chair of the ISA71 Committee that is responsible for this standard. “We had tried on several occasions to update the standard, but the general mood of the committee was that no one was really asking us to do so.” However, the implementation of RoHS regulations in 2006 and the undeniable link between the changes required to electronic equipment and the increasing number of failures attributed to corrosion – especially for information technology (IT) and datacom equipment used in mission critical applications – prompted a new call for a review.

The switch to lead-free manufacturing affected essentially all electronic products, and some of the more common materials used as replacements were particularly more sensitive to common atmospheric pollutants than lead-based materials. Manufacturers of industrial process control equipment have used ISA-71.04 since its initial publication for warranty compliance because they understood that their equipment had to be protected due to the corrosive nature of the environments in which it would be used. However, the same had not been the case for computer systems used in non-industrial settings.

^[1] The first legislation of this type was the European Union (EU) directive 2002/95/EC “on the **R**estriction **o**f the use of certain **H**azardous **S**ubstances in electrical and electronic equipment.” Official Journal L 037, 13/02/2003 P. 0019 – 0023. See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2003:037:0019:0023:EN:PDF> (accessed September 2013).

The number and types of corrosion failures have increased dramatically around the world in locations with high pollution levels, and the most common failures were with the most common components including hard disk drives (HDD), graphic cards, motherboards, DIMMs, capacitors, and transistors. Research performed by many of the world's leading IT equipment manufacturers including AMD, Cisco, Cray, Dell, EMC, Hitachi, HP, IBM, Intel, Seagate, SGI and Sun Microsystems, led to the publication of an industry white paper detailing requirements necessary to manage contamination risks.

“In fact, the rate of failures had become so severe in some locations that many of these same companies changed their products warranties to include requirements for the control of corrosion caused by gaseous contamination using ISA-71.04 as the basis for compliance” says Muller. “Their research efforts also provided much of the data we needed to update the standard.”

“The increase in the rate of failures of IT equipment in recent years due to corrosion has been mainly due to a combination of factors such as the change to ROHS-compliant hardware and the explosive growth of computer usage in emerging markets with heavily polluted environments” reports Dr. Prabjit Singh, Senior Technical Staff Member in Materials Engineering for IBM.

“This revision to ISA-71.04 will help the IT industry greatly by specifying acceptable air quality in mission critical environments such as data centers. The data center owners now have a simple air quality goal that if met should ensure that their equipment will be essentially free from corrosion-related failures.”

A similar sentiment is echoed by Aamir Kazi, who works with the Development Reliability Engineering Group at Dell Computers. “The new ISA-71.04 standard moves toward industry alignment to a common air quality specification, in the context of newer regulation-compliant materials and processes which are more sensitive to contaminant levels.”

After more than three years of effort from the ISA71 committee, ANSI/ISA-71.04-2013 was approved by the American National Standards Institute on August 16, 2013. The purpose of this new standard is to classify airborne contaminants that may affect electronic hardware, such as process measurement and control instruments, IT, telecommunications, networking and data center equipment, and electronic office equipment. This standard covers contaminants that affect industrial process measurement and control equipment, electronic office equipment, data center and network equipment, climate control such as heating, ventilating, and air-conditioning (HVAC) equipment.

“As more airside economization is utilized in the mission critical environment it will become proportionally more critical to monitor and treat the air when indicated in this type of facility,” says David C. Meadows II, Chief Applications Engineer at Stulz Air Technology Systems, Inc. “The changes in the standard recognize this and give needed guidance to all stakeholders on how to deal with airborne containments in the process cooling environment.”

“Real-time corrosion monitoring is becoming a requirement to provide owners and end users the data they need to make critical decisions about when to economize and when not to. The research that has generated the latest changes to the standard has provided a solid knowledge base from which to make these decisions.”

“This 2013 edition of the standard has several new features and includes updates due to the changes required for electronic equipment based on RoHS or “lead-free” regulations that were originally passed into law in the European Union but have now been passed into law in many other countries,” says Muller. For information about viewing or obtaining this standard, visit www.isa.org/findstandards, select “71” from the drop-down list and scroll down – or contact 1-919-990-9200.

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