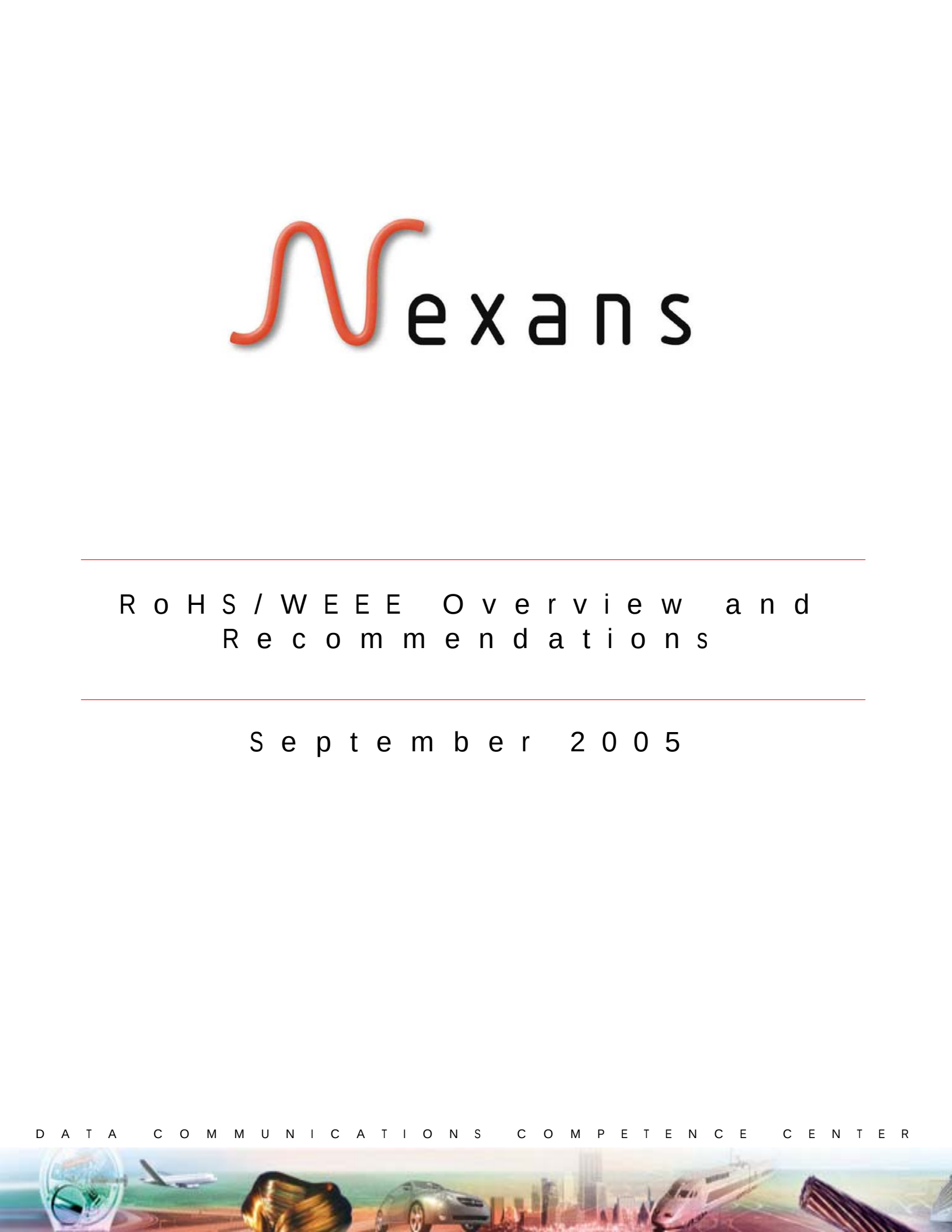

RoHS/WEEE Overview and Recommendations

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DATA COMMUNICATIONS COMPETENCE CENTER

Abstract

The increasing global awareness of the impact that products and the manufacturing processes used to make them has on the ecology has prompted efforts to control and ameliorate this impact. There have been efforts that focus on pursuing consensus to reduce both emissions and material consumption. Other efforts have been targeted at improving processes with the goal of reducing global repercussions. Recently, the European Union has implemented a set of requirements for a specific family of products and materials. The intent is to reduce and eventually eliminate their future ecological impact. These requirements, colloquially known as RoHS and WEEE, have been referenced or adopted into the legislation of many nations that are moving toward increased ecological responsiveness. Increasingly, this means that compliance to the requirements of RoHS and/or WEEE may well be mandated outside of the European Union in the near future.

What are RoHS and WEEE?

The Restriction of the use of Hazardous Substances (RoHS) is a legal document that the European Economic Union issued in 2003 (Directive 2002/95/EC). The directive bans the sale of new electronic equipment into Europe if it contains more than trace amounts of six substances defined as hazardous. This ban comes into force in Europe on July 1st, 2006.

The Waste Electrical and Electronic Equipment initiative (WEEE) sets recovery, reuse and recycling targets for each of ten categories that are to be met by December 31st, 2006 (Directive 2002/96/EC). The Medical Devices category is to be set by December 2008 and the Measuring and Control Instruments Category is currently not set. The Information Technology and Telecom Equipment Category addresses the market for data and telecom cabling products. However, the primary material content concerns for cabling products are addressed under RoHS, which will be the focus of this article.

Although RoHS is a European Union Directive that currently applies only to Europe, global efforts to reduce the usage of hazardous substances have accelerated. The goal of RoHS is to restrict the use of these substances in equipment that will eventually accumulate in local landfills or local dumpsites resulting in ecological contamination concerns. It is expected that when RoHS is fully implemented, human health and global environment improvements will result.

In the United States, several states have already enacted legislation that requires equipment manufacturers to comply with RoHS requirements. California, Hawaii, Maine, Michigan, and New York have enacted bans on Polybrominated diphenyl ethers (PBDEs), which are commonly used as a flame retardant in a variety of plastics. Similar legislation on PBDEs is under consideration in another seven states (Connecticut, Illinois, Maryland, Minnesota, Missouri, Oregon, and Washington). Additional legislation, calling for restrictions on numerous other materials and products are pending.

Increasingly, in the United States, calls for verification of product or material compliance to the requirements of RoHS have become commonplace.

Globally, Japan has had a similar program to reduce lead contamination for years. China has adopted RoHS along with its implementation timeline. Korea has enacted a voluntary program compliant to RoHS. Although adoption of a program similar to RoHS may not become globally pervasive, it is certain that most nations conduct, or will conduct trade with partners that have adopted such a program. As such, it is incumbent upon commercial or national entities to review their product portfolios in light of RoHS (and similar) program requirements.

What Materials are Restricted?

RoHS restricted substances, listed with their Maximum Concentration Values (MCV), are:

Cadmium (Cd)	0.1%
Mercury (Hg)	0.1%
Lead (Pb)	0.1%
Polybrominated biphenyls (PBBs)	0.1%
PBDEs	0.1%
Hexavalent Chromium (Cr6+)	0.01%.

These MCV limits apply to each “homogeneous material,” which is defined by the European Commission as a material that cannot be mechanically disjointed or separated into different materials. Understanding this distinction is significant. For example, the concentration of PDBE’s in a 100-strand cable may only be 0.02%, its concentration in the flame retardant sheath of that cable, however, may be 0.4%. The typical “homogeneous materials” in a data cable may include (but are not limited to) cable sheaths, strength yarns, armor layers, water blocking powders/yarns/tapes/gels, strands or optical fibers. This distinction regarding “homogeneous material” is crucial to the manufacturer or vendor as they may be required to prove “due diligence” in ensuring their efforts towards RoHS compliance.

Some typical uses of these restricted substances include Cadmium used in pigments and colorants for plastics in the wire and cable industry. Mercury is used in batteries, electrical switches, computer equipment relays and in some thermometers. Lead is widely used as a thermal stabilizer in plastics such as polyvinyl chlorides (PVC’s). PBBs were commonly used as flame retardants but manufacturers ceased utilizing them in the United States in 1976 and globally in 2000. PDBEs are commonly used as flame retardants in a variety of plastics. Hexavalent Chromium has been used in pigments, dyes, inks, chrome plating and as wood preserving. These examples of usages are typical but not an exhaustive list. The vendor should not assume the absence of these prohibited materials, and if they are present they need to determine the concentration.

Certain materials are used because of their effectiveness and/or economic cost advantages. Replacement of these materials with RoHS-compliant materials, if possible, may not garner the same level of effectiveness and efficiency. RoHS has specified some exemptions for some specific applications or product groups and an additional twenty-two exemptions have been identified for consideration during the next review of the RoHS directive. The status of exemption requests that have been accepted for review has not been defined, but reliance upon eventual adoption is not recommended.

What do I need to test and how is it tested?

If you are a material manufacturer, you must establish the compliance of your product against these declared substances. If you use materials in the manufacture of your products, you may attempt to get certification of compliance from the material vendor. This certificate should detail the content percentage (or declare the absence) of RoHS proscribed materials.

The American Society of Testing and Materials (ASTM) International has created Committee F40 on *declarable substances* in materials to help industries develop standards and test methods to be used in verifying compliance. Until such developments yield results, most labs are using current tests to establish concentrations of these substances in homogeneous materials.

How can I identify a RoHS compliant Product?

There is no current requirement, globally or in the United States, for the implementation of a RoHS compliance application mark, nor have third party auditing procedures by independent bodies been specified. At present, vendors are required to self-declare their compliance to RoHS for products entering Europe.

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Nexans' Data Communications Competence Center, located at the Berk-Tek Headquarters in New Holland, Pennsylvania, focuses on advanced product design, applications and materials development for networking and data communication cabling solutions. The Advanced Design and Applications team uses state-of-the-art, proprietary testing and modeling tools to translate emerging network requirements into new cabling solutions. The Advanced Materials Development and Advanced Manufacturing Processes teams utilize sophisticated analytical capabilities that facilitate the design of superior materials and processes. The Standardization and Technology group analyzes leading edge and emerging technologies and coordinates data communication standardization efforts to continuously refine Nexans' Technology Roadmap. An international team of experts in the fields of cable, connectors, materials, networking, standards, communications and testing supports the competence center. The competence center laboratories are a part of an extensive global R&D network that includes nine competence centers and the Nexans Research Center headquartered in Lyon, France.

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