

10 June 2009

DIGITALEUROPE POSITION PAPER ON THE POSSIBLE RELATION BETWEEN LASER PRINTING SYSTEM TONERS/EMISSIONS AND INDOOR AIR QUALITY (IAQ) – MAY 2009

EXECUTIVE SUMMARY

The health and safety of customers has always been of high priority for DIGITALEUROPE member companies. DIGITALEUROPE is aware that some attempts to link toners/emissions from electro-photographic printing systems and copiers to indoor air quality (IAQ) and health issues have been made. In response, our industry has been instrumental in creating and applying recognised standards for testing consumer and professional equipment. Our member companies are also committed to furthering the knowledge of toners/emissions from electro-photographic printing systems and copiers and are committing considerable resources to pursue this knowledge.

Current scientific findings and expert knowledge confirm that no health risks specific to device emissions or toners are to be expected from electro-photographic printing systems when used as intended. This includes monochrome and colour toners as well as emissions of relevant substances and particles. Hence we urge the European Commission and other interested stakeholders to consider all the available data on potential health effects linked to toners/emissions from electronic equipment when looking at this issue. Our members are very keen to have a dialogue with stakeholders on this topic and will continue to share with them the results of future research.

The European Union is currently leading discussions on IAQ. Preliminary studies and risk assessments have been conducted by experts to provide a scientific basis for developing and implementing policies on IAQ. In their report⁽¹⁾, the Scientific Committee on Health and Environment Risk (SCHER) recommends that all sources emitting particles and chemicals should be evaluated when considering air quality. This supports our stance that laser printing systems should not play the major role in current IAQ considerations. Therefore, DIGITALEUROPE thinks it is inadequate to put the devices in the focus of the discussion.

Our industry developed internationally-accepted standards such as ISO/IEC standard 28360:2007⁽²⁾ to measure emissions associated with laser printing systems in a controlled scientific manner.

In 2007 and 2009, the Australian Queensland University of Technology (QUT) published research on ultrafine particle (UFP) number concentrations emitted from electro-photographic printing devices.⁽³⁾ Results show that conclusions on any potential health effect cannot be drawn to date and that more research is needed. In addition, the German industry

association BITKOM is driving studies into the matter at the recognised Fraunhofer Wilhelm-Klauditz Institute (WKI) in Germany.

We naturally recognise and support the regulation of indoor air quality related to established and agreed findings. However, requirements should be based on established facts and protocols and appropriately consider and prioritise the complex situation indoors.⁽⁴⁾ DIGITALEUROPE and the printer industry believe that any health risk assessment related to printer toners/emissions should be managed through DG SANCO, not through the EuP Directive. The EuP Directive is predominantly dealing with issues surrounding the energy use of products and we are concerned that introduction of another issue into those discussions will divert attention from the important task at hand.

Below we expand on our view and experience regarding emissions.

1- EMISSIONS FROM LASER PRINTING EQUIPMENT

To ensure a high degree of user safety, laser printing systems manufacturers are investigating potential emissions from their products. The measurements are based on international and national standards (e.g. ISO/IEC standard 28360:2007, Blue Angel measurement criteria acc. to RAL-UZ 122), and the results are checked against occupational health and safety requirements as well as indoor air quality guidelines. In addition to design measures taken to minimise emissions, manufacturers provide instructions (e.g. in manuals) regarding workplace conditions to ensure the safety of users even further. If used as intended, no health risks specific to emissions from electro-photographic printing systems and copiers are to be expected.

Various studies completed by manufacturers and third parties underline this conclusion regarding the effect of equipment operation on indoor air quality and customer health. One scientific evaluation on potential health hazards due to emissions of electro-photographic printing systems and copiers concluded that “there have been no scientifically established indications that the operation of modern electro-photographic printing systems and copiers in offices leads to an increased health-relevant exposure caused by toners and VOCs”⁽⁵⁾. Moreover, a study conducted by the Joint Research Centre (JRC) in 2007⁽⁶⁾ confirmed that emissions from, both, black and white, and colour printers are very low. The JRC could not link these emissions to any possible health risks on scientific basis. DIGITALEUROPE would welcome the SCHER and the European Commission to take these and other findings into consideration to support the risk assessment task.

Furthermore, some eco-labels include emission criteria within their compliance criteria, such as the internationally recognised Blue Angel⁽⁷⁾ for printing devices (RAL-UZ 122). Standard ECMA-328 specifies methods to determine chemical emission rates from electronic equipment. Published in June 2007, the third version of Standard ECMA-328 is in line with ISO/IEC 28360 standard. The contribution of emissions from laser printing equipment to indoor concentrations is far below German occupational exposure limits (AGW) and exposure limits of the US Occupational Health and Safety Administration (OSHA). These exposure values also comply with the internationally accepted WHO regulations for indoor

environments⁽⁸⁾ and the indoor air quality guidelines from the US Environmental Protection Agency (US EPA)⁽⁹⁾.

A dedicated health research pilot study⁽¹⁰⁾, performed by the University Medical Centre of the University of Giessen on behalf of the German ‘Bundesinstitut fuer Risikobewertung’⁽¹¹⁾ (BfR), states that there are no conclusive indications for potential health risks associated with the use of electro-photographic printing devices. In detail, the final report concludes that “most indoor parameters are within the range of concentrations found in normal private homes”. The author further states that based on single parameters “quantitative and toxicological evaluations do not permit drawing conclusions about hygienically or health relevant implications of emissions from electro-photographic printing systems and copiers”. This assessment considers both determined concentrations of volatile organic compounds (TVOCs and VOCs) and particles. In the clinical part of the study 69 employees at 63 German workplaces were examined, with the following result: The clinical, immunological and chemical parameters did not show any implications for health. In all, the pilot study confirms that there is no “significant correlation” between the exposure to office equipment emissions and health impairments, also due to insufficient data according to the BfR.

Commenting on two minor interpellations by the green party at the German Bundestag in 2007 and 2009, the German Federal Government additionally stated that there are no indications for health risks specific to laser printing systems when the devices are used in private homes.⁽¹²⁾

2- MEASUREMENT OF ULTRAFINE PARTICLES (UFPs) EMITTED BY ELECTRO-PHOTOGRAPHIC PRINTING SYSTEMS AND COPIERS

Testing of UFPs from electro-photographic printing systems and copiers is a new scientific discipline. In 2006, the German Federal Environment Agency (UBA) found ultrafine particles (< 0.1µm) within the very small amount of particulate matter emitted. The UBA has stated it is currently not possible to comment on the chemical composition or potential health risks which might be posed by these UFPs⁽¹³⁾. The measured quantities of UFP emissions are not higher than those generated by many other every day activities such as toasting or frying.

Recent studies by the German WKI⁽¹⁴⁾ and of Queensland University of Technology⁽³⁾ confirm that UFPs from laser printing devices are predominantly not toner particles, but are comprised of condensed volatile-type materials. The German BfR⁽¹⁵⁾ also states that such UFPs released are predominantly not toner material. At the bottom line, there is currently no scientific ground to expect health risks specific to UFPs when electro-photographic printing systems are operated as intended.

In order to assess whether a health issue might be related to ultrafine particles from electro-photographic printing devices and if there is an influence on indoor air quality, it is vital to understand their chemical and physical properties, average concentration levels as well as potential exposure of users in real-room scenarios. It is essential to compare those properties with properties from UFPs released by other everyday processes in the indoor environment like toasting, hair drying, cooking, etc.

Still, more information is needed through research to develop a solid scientific knowledge regarding the nature, quantity and origin of these UFPs in order to be able to determine any necessary action. The JRC study supports industry statement: 'in order to evaluate possible health risks and assess the health effects of human exposure, information on toxicological data and on the exposure concentrations is needed'. Industry is investing in this research to further our understanding of this science.

DIGITALEUROPE believes that prior to initiating any form of workplace or equipment risk assessment a test protocol which considers all aspects of testing and evaluation must be agreed and issued as a standard. This is the only way to avoid either overestimation or underestimation of the issues related to UFP-emissions. In line with accepted practice the protocol should be suitable for assessment under accepted methods for test accreditation. DIGITALEUROPE companies have developed individual approaches to define scientifically-founded test protocols. The German industry association BITKOM together with the WKI provided a proposal which will go into standardisation as a next step. DIGITALEUROPE believes that such a standard test protocol should be implemented to ensure a global understanding of the printer emission impact, not only among industry but also by consumers and authorities.

3- TONER PREPARATIONS

It is important to note that toner particles are not ultrafine particles. In order to ensure a high degree of user safety, toners for original equipment are tested and classified in accordance with EU criteria governing preparations (supplementing Directive 1999/45/EC). Besides that, manufacturers ensure the high quality of their products and processes and they will take into consideration human health and environment within product development, as well as international standards such as ISO 9001:2000 (Quality Management System) and ISO 14001:2004 (Environmental Management Systems).

4- CONCLUSION

No health risks specific to device emissions or toners are to be expected from electro-photographic printing and copying systems when used as intended. To measure potential emissions of both particles and chemicals manufacturers belonging to DIGITALEUROPE are generally testing their electro-photographic printing systems and copier systems in special test chambers under extreme operating conditions.

Industry continues to support further research into UFP emissions from electro-photographic printing systems and copiers. DIGITALEUROPE pledges to update the Commission and other stakeholders regularly on the latest scientific research. For the benefit of consumers, DIGITALEUROPE requests that a close information sharing collaboration is established between industry, the Commission and other stakeholders.

- (1) SCHER's opinion on risk assessment on indoor air quality, published in June 2007.
- (2) ISO/IEC standard 28360:2007: standard to determine chemical emission rates of Volatile Organic Compounds (VOC), and other aldehydes and ketones, ozone and particulate matter from ICT & CE equipment in using mode in an Emission Test Chamber (ETC). Published in June 2007, the third version of Standard ECMA-328 is in line with ISO/IEC 28360 standard. ECMA International: industry association which develop standardization of Information and Communication Technology (ICT) and Consumer Electronics (CE). <http://www.ecma-international.org/publications/standards/Standard.htm>
- (3) Morawska L. – Queensland University of Technology in Brisbane – Study published on the American Chemical Society's Environmental Science & Technology (ES&T) - 1 August 2007; Morawska L. et al. – An investigation into the characteristics and formation mechanisms of particles originating from the operation of laser printers, 2009.
- (4) Klotz/Lahm, Aktuelle Erkenntnisse zur Innenraumluftqualität [Current findings on Indoor Air Quality], GRdL 66 (2006) no. 5, May 2006; Kotzias, D et al., The INDEX project, Joint Research Center, December 2004.
- (5) Ewers, U and Nowak, D, "Health Hazards Caused by Emissions of laser Printers and Copiers", GRdL 66 (2006) no.5.
- (6) J. Barrero Moreno, P. Leva, O. Geiss, S. Tirendi, A. Bellintani, F. Reniero, D. Kotzias – Joint Research Centre - Within the Administrative Arrangement N° 22868 CHEMTEST – On behalf of DG SANCO - Report on the emission tests from office equipment in the indoortron environmental chamber – 2007.
- (7) The Blue Angel (Der Blaue Engel in German): German eco-label, and oldest environmental label in the world. Now, about 3,700 products and services in 80 product categories bear the Blue Angel. http://www.blauer-engel.de/englisch/navigation/body_blauer_engel.htm
- (8) World Health Organization (WHO), 2000.
- (9) US Environmental protection Agency (US EPA), Reference Concentration (RfC).
- (10) German Federal Institute for Risk Assessment (BfR), Final Report Pilot Study, January 2008.
- Study conducted by the Institute of Indoor- and environmental Toxicology at the University of Giessen. Scope: emissions of laser printers and photocopiers, and health effects in 63 offices with 69 office-workers.
- (11) German Institute for Risk Assessment.
- (12) German Bundestag, Answer of the German Federal Government, printed matter, 16/4016, 2007 and 16/11935, 2009.
- (13) German Federal Environment Agency, Bake/Moriske, February 2006.
- (14) Science of the Total Environment, Wensing et al., 2008.
- (15) German Federal Institute for Risk Assessment (BfR), final health assessment No. 014/2008, 31 March 2008 und press information 07/2008, 18 April 2008.

ABOUT DIGITALEUROPE

DIGITALEUROPE, the organisation formerly known as EICTA, is the voice of the European digital technology industry, which includes large and small companies in the Information and Communications Technology and Consumer Electronics Industry sectors. It is composed of 61 major multinational companies and 40 national associations from 28 European countries. In all, DIGITALEUROPE represents more than 10,000 companies all over Europe with more than 2 million employees and over EUR 1,000 billion in revenues.

THE MEMBERSHIP OF DIGITALEUROPE

COMPANY MEMBERS:

Adobe, Agilent, Alcatel-Lucent, AMD, Apple, Bang & Olufsen, Bose, Brother, Canon, Cisco, Corning, Dell, EADS, Elcoteq, Epson, Ericsson, Fujitsu, Hitachi, HP, IBM, Infineon, Ingram Micro, Intel, JVC, Kenwood, Kodak, Konica Minolta, Lexmark, LG, Loewe, Micronas, Microsoft, Mitsubishi, Motorola, NEC, Nokia, Nokia Siemens Networks, Nortel, NXP, Océ, Oki, Oracle, Panasonic, Philips, Pioneer, Qualcomm, Research In Motion, Samsung, Sanyo, SAP, Sharp, Siemens, Sony, Sony Ericsson, STMicroelectronics, Sun Microsystems, Texas Instruments, Thales, Thomson, Toshiba, Xerox.

NATIONAL TRADE ASSOCIATIONS:

Austria: FEEI; **Belarus:** INFOPARK; **Belgium:** AGORIA; **Bulgaria:** BAIT; **Cyprus:** CITEA; **Czech Republic:** ASE, SPIS; **Denmark:** DI ITEK, IT-BRANCHEN; **Estonia:** ITL; **Finland:** FFTI; **France:** ALLIANCE TICS, SIMAVELEC; **Germany:** BITKOM, ZVEI; **Greece:** SEPE; **Hungary:** IVSZ; **Ireland:** ICT IRELAND; **Italy:** ANITEC, ASSINFORM; **Netherlands:** ICT OFFICE, FIAR; **Norway:** ABELIA, IKT NORGE; **Poland:** KIGEIT, PIIT; **Portugal:** AGEFE, APDC; **Romania:** APDETIC; **Slovakia:** ITAS; **Slovenia:** GZS; **Spain:** AETIC, ASIMELEC; **Sweden:** ALMEGA; **Switzerland:** SWICO; **Turkey:** ECID, TESID, TÜBISAD; **Ukraine:** IT UKRAINE; **United Kingdom:** INTELLECT.