
**Information technology — Office
equipment — Determination of chemical
emission rates from electronic equipment**

*Technologies de l'information — Équipement de bureau —
Détermination des taux d'émission chimique d'un équipement
électronique*

Withhold

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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Withdrawing

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 28360 was prepared by Ecma International (as ECMA-328) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

This second edition cancels and replaces the first edition (ISO/IEC 28360:2007), which has been technically revised. It also incorporates the Technical Corrigendum ISO/IEC 28360:2007/Cor.1:2008.

Introduction

Globally, governmental agencies, academic institutions, environmental organizations and manufacturers have developed methods to determine chemical emissions from electronic equipment. These attempts, however, resulted in a range of tests, the results of which are not necessarily comparable, either qualitatively or quantitatively.

Following the publications of the first edition of ECMA-328 and the “Test method for the determination of emissions from Hard Copy Devices” (RAL-UZ 122), experts from the German Federal Institute for Materials Research and Testing (BAM) and Ecma have collaborated to harmonise methods to determine the chemical emission rates from information and communication technology (ICT) and consumer electronics (CE) equipment in this second edition.

In addition to stricter test procedures, the second edition uses generalised emission formulae, and their derivations developed in Annex C, to calculate emission rates from concentrations of analytes that are measured in Emission Test Chambers (ETC).

The third edition of ECMA-328 was fully aligned with the first edition of ISO/IEC 28360, adopted under ISO/IEC JTC 1's fast-track procedure and published in September 2007.

In addition, the fourth edition fixes a number of errata on ISO/IEC 28360:2007 that JTC 1/SC 28 identified.

Following the publications of the fourth edition of ECMA-328 and the “Test method for the determination of emissions from Hard Copy Devices” (RAL-UZ 122), experts from the BAM, the Wilhelm-Klauditz-Institut (WKI), the Japan Business Machine and Information System Industries Association (JBMIA) and Ecma have collaborated to harmonise methods to determine the fine particle (FP) and ultrafine particle (UFP) emissions from hard copy devices in the fifth edition.

Information technology — Office equipment — Determination of chemical emission rates from electronic equipment

1 Scope

This International Standard specifies methods to determine chemical emission rates of analyte from information and communication technology (ICT) and consumer electronics (CE) equipment during intended operation in an Emission Test Chamber (ETC).

The methods comprise preparation, sampling (or monitoring) in a controlled ETC, storage and analysis, calculation and reporting of emission rates.

This International Standard includes specific methods for equipment using consumables, such as printers, and equipment not using consumables, such as monitors and PCs. [Annex A](#) specifies monochrome and colour print patterns for use in the operating phase of EUT using consumables (e.g. paper).

The following are examples of EUT that do not use consumables:

- monitors and TV sets (CRT, plasma, LCD, rear projector, beamer);
- video (VCR, DVD player/recorder, camcorder);
- SAT receiver (Set-Top Box);
- audio units (CD player/recorder, home theatre systems, audio home systems, micro-/mini-, midi-systems, amplifier, receiver);
- portable audio (CD player, MP 3 player, radio recorder, clock radio, etc.);
- computer (desktop, tower, server), portable computers (notebooks).

Emission rates from EUT using consumables may also be determined according to additional requirements identified by "RAL-UZ 122 Option".

Calculations use the generalised model and approximations thereof as developed in [Annex C](#).

The emission rates determined with this method may be used to compare equipment in the same class.

Predictions of "real indoor" *concentrations* from the determined *emission rates* are outside the scope of this International Standard.

2 Conformance

Determinations of emission rates and total number of emitted particles conform to this International Standard when:

1. executed using a Quality Assurance Project Plan, Quality Assurance and Quality Control as specified in ISO 16000-9;
2. tested in a controlled ETC as specified in [Clause 7](#);
3. sampled/monitored and calculated as specified in [Clause 8](#) and [Annex B](#);
4. reported as specified in [Clause 9](#).

For EUT using consumables, determinations according to additional requirements identified by “RAL-UZ 122 Option” herein conform to the RAL-UZ 122 Option [1].

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7779, *Acoustics — Measurement of airborne noise emitted by information technology and telecommunications equipment* (ECMA-74)

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

ISO 13655, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*

ISO 16000-3, *Indoor air — Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method*

ISO 16000-6, *Indoor air — Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on TENAX TA sorbent, thermal desorption and gas chromatography using MS or MS-FID*

ISO 16000-9, *Indoor air — Part 9: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test chamber method*

ISO 16017-1, *Indoor, ambient and workplace air — Sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography — Part 1: Pumped sampling*

EN 55013:2001, *Sound and television broadcast receivers and associated equipment — Radio disturbance characteristics — Limits and methods of measurement*

CIE 15:2004, *Colorimetry*, 3rd edition, Commission Internationale de l'Éclairage, ISBN: 9783901906336