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Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 5: Thermal management

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**Environmental Engineering (EE);
European telecommunication standard
for equipment practice;
Part 5: Thermal management**

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Environmental Engineering (EE).

The present document is part 5 of a multi-part deliverable. Full details of the entire series can be found in part 1 [3].

The present document applies to all telecommunications rack/cabinet; miscellaneous rack/cabinets and subracks forming part of the public telecommunications network.

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Introduction

The power density of equipment has been rising and will continue to do so for the foreseeable future. Equipment suppliers have tried to overcome their thermal issues in isolation resulting in different solutions being developed. When different racks from various suppliers are co-located they can have a detrimental effect on each other. The present document specifies the thermal management requirements to prevent equipment having a detrimental thermal influence on surrounding equipment.

1 Scope

The present document specifies the preferred thermal management solutions for subracks, racks/cabinets and miscellaneous racks/cabinets (as described in EN 300 119 series [5]) installed indoors in restricted access locations (as defined in EN 60950-1 [2]), for the removal of heat dissipated by one or more subracks in an ETSI rack.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] ETSI EN 300 019: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment".
- [2] CENELEC EN 60950-1: "Information technology equipment - Safety - Part 1: General requirements".
- [3] ETSI EN 300 119-1: "Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 1: Introduction and terminology".
- [4] ETSI EN 300 019-1-3: "Environmental Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment; Part 1-3: Classification of environmental conditions; Stationary use at weatherprotected locations".
- [5] ETSI EN 300 119: "Environmental Engineering (EE); European telecommunication standard for equipment practice".
- [6] ETSI TR 102 489: "Environmental Engineering (EE); European telecommunications standard for equipment practice; Thermal Management Guidance for equipment and its deployment".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

ambient: spatial maximal temperature of the air entering the rack/cabinet

cabinet: free-standing and self-supporting enclosure for housing electrical and/or electronic equipment

NOTE: It is usually fitted with doors and/or panels, which may or may not be removable.

equipment: for the purposes of EN 300 119-5, the term equipment shall mean equipped subracks, racks/cabinets and miscellaneous racks/cabinets

integrator: end user/operator of telecommunication or IT equipment or their agent (for example, an equipment manufacturer could be an operator's agent)

micro-climate: conditions found within the rack/cabinet creating a local ambient for the subrack

NOTE: In practice this will typically result in elevated temperatures and reduced relative humidities to those quoted in EN 300 019-1-3 [4].

miscellaneous rack/cabinet: accommodates subracks of several different types of equipment and suppliers and shall be freely configurable by the end user or their agent

rack: free-standing or fixed structure for housing electrical and/or electronic equipment

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

ARCM	Any Rack/Cabinet and Miscellaneous Rack/Cabinet
MRC	Miscellaneous Rack/Cabinet

4 General requirements

4.1 Thermal performance

The supplier of the equipment shall design the equipment so that the product fulfils the indoor environments as detailed in EN 300 019-1-3 [4]. On request, the supplier shall be able to provide, as a minimum, the information included in annex A.

4.2 Temperature of touchable parts

Requirements for safety are outside the scope of the present document. For safety reasons it is important that the temperature rise of touchable parts are within guidelines to ensure the safety of personnel. Safety standards are published by CENELEC, for example a CENELEC product safety standard is EN 60950-1 [2]. Specifically see clause 4.5 "Thermal Requirements".

4.3 Temperature of issuing air

If the air issuing from the equipment racks/cabinets under worst case conditions (maximum ambient temperature) can come into contact with equipment cables, the temperature of the air shall not exceed 75°C. See CENELEC product safety standard EN 60950-1 [2], specifically clause 4.5 "Thermal Requirements", table 4b.

5 Thermal management

It is a primary requirement for all equipment to be cooled by natural convection. The mechanical architecture of the ARCM shall be designed to promote natural convection. Assisted cooling methods should be employed only when natural convection methods are unable to deal with the relevant heat dissipation.

The terms left and right used in this clause are viewed from the front of the ARCM.

5.1 Subrack air flow paths

The preferred air flow route into a subrack is in at the left, front or bottom and out at the right, back or top.

5.2 ARCM air flow paths

The preferred air flow route for an ARCM is air in at the front and air out of the top.

If ventilated floor exists, the air inlet can be at the bottom.

NOTE 1: The mixing of parallel and serial air flows within the same ARCM is not preferred but may be implemented, see TR 102 489 [6].

NOTE 2: For subrack parallel air flows, methods shall be provided to prevent air mixing between subracks.

NOTE 3: The performance of the various options may be compromised by removal/omission of ARCM covers and panels.

NOTE 4: Care should be taken to ensure that the cabling does not adversely affect (restrict) the air flow.

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