

Mechanical structures for electronic equipment — Design guide: Interface dimensions and provisions for water cooling of electronic equipment within cabinets of the IEC 60297 and IEC 60917 series

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National foreword

This Draft for Development is the UK implementation of IEC/TS 62454:2007.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the international organization responsible for its conversion to an international standard. A review of this publication will be initiated not later than 3 years after its publication by the international organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into an international Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee EPL/48, Electromechanical components and mechanical structures for electronic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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TECHNICAL SPECIFICATION

Mechanical structures for electronic equipment – Design guide: Interface dimensions and provisions for water cooling of electronic equipment within cabinets of the IEC 60297 and IEC 60917 series

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INTRODUCTION

The increasing computing performance of electronic devices with increasing electrical power consumption creates very high heat loads within electronic cabinets.

Next generations of electronic equipment built into cabinets require new ways of cooling. State of the art in office or data centre environments is the cooling by ambient air, within air conditioned rooms. The dimensioning of the heat loads was typically based on approximately 1 kW per cabinet. Next generation equipment cooling solutions, as described in this Technical specification, take heat loads of up to 35 kW per cabinet under consideration.

The heat management in such installations becomes difficult if the heat per cabinet reaches such levels or if the distribution across the multiple cabinets becomes extremely uneven.

In order to meet such heat spots or uneven heat concentration, it is necessary to conduct the heat to the outside of the room, instead of loading the room. The proposed solution uses water cooled heat exchangers within the individual cabinet.

Assuming that the chilled water supply is the easiest cooling opportunity within existing infrastructures and new installations, this Technical specification was initiated for the definition of dimensional interfaces and cooling performance guidelines.

Three different cooling arrangements for heat exchangers within cabinets have been regarded, called “interface levels”, where level 1 and 2 are described in detail in this Technical specification. The third level, which is per definition the component level on a single board is not described in detail due to the fact, that such an interface depends on too complex design details and that a water cooled heat sink is used, principally working by conduction cooling of the component (e.g. processor). Level 3 is described by some basic considerations of the interfaces.

For a clear definition of interface dimensions and cooling performance guidelines, only cabinets have been regarded from the IEC 60297 (19 in) and IEC 60917 (25 mm) series.

Interface level 1: Cabinet with heat exchanger bottom or side mounted for the cooling of a whole cabinet.

Interface level 2: Cabinet with sectional heat exchanger, dedicated to individual subracks or groups of subracks.

Interface level 3: Cabinet with inbuilt subrack where the water pipe connects to components on individual boards.

In this Technical specification, the terms ‘Water’ and ‘Air’ require further definition in application specific standards or specifications.

MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT – DESIGN GUIDE: INTERFACE DIMENSIONS AND PROVISIONS FOR WATER COOLING OF ELECTRONIC EQUIPMENT WITHIN CABINETS OF THE IEC 60297 AND IEC 60917 SERIES

1 Scope and object

This technical specification provides interface dimensions and cooling performance guidelines for cabinets, using water supplied heat exchangers. For a clear definition of interface dimensions and cooling performance guidelines, only cabinets have been regarded from the IEC 60297 (19 in) and IEC 60917 (25 mm) series.

As the cooling performance is in direct relation to volume flows and temperatures of air and water, cooling performance guidelines are provided for two structural interface levels – Interface level 1 and 2 – of equipment built into cabinets.

The third interface level is only described by main interfaces, but without detailed dimensions and without cooling performance guidelines. This interface needs very complex details for the ducting of water supply within the cabinet and down to the component heat sinks on boards within subracks. Therefore, only the principle is shown usable for individual design solutions.

2 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.

IEC 60297-2, *Dimensions of mechanical structures of the 482,6 mm (19 in) series – Part 2: Cabinets and pitches of rack structures*

IEC 60917-2-1, *Modular order for the development of mechanical structures for electronic equipment practices – Part 2: Sectional specification – Interface coordination dimensions for the 25 mm equipment practice – Section 1: Detail specification – Dimensions for cabinets and racks*

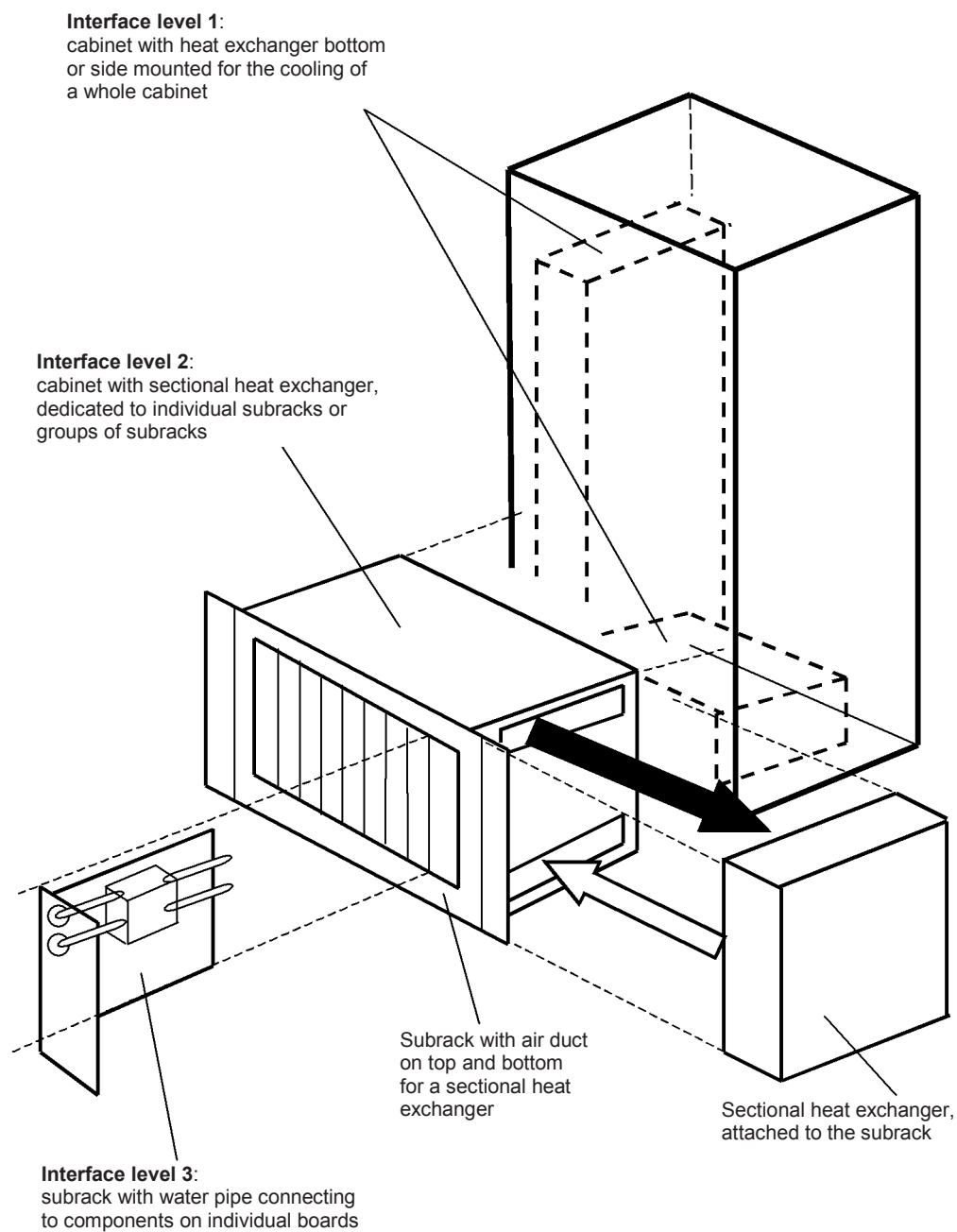
IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*
Amendment 1 (1999)

ISO 228-1:2000, *Pipe threads where pressure tight joints are not made on the threads – Part 1: Dimensions, tolerances and designation*

ISO 11690-1, *Acoustics – Recommended practice for design of low-noise workplaces containing machinery – Part 1: Noise control strategies*

3 Arrangement overview

The arrangement overview shown in Figure 1 illustrates the typical interface levels.



IEC 1995/07

Figure 1 – Arrangement overview: three interface levels for cooling of electronic devices, within a cabinet

4 Interface level 1: Cabinet with heat exchanger, bottom or side mounted

4.1 General

The following figures illustrate the mounting positions of the heat exchanger and the direction of the air circulation. For the individual application, the provided cabinet dimensions and dimensions relevant for the air volume shall be used as the reference.