

**Mechanical structures for electronic equipment -
Thermal management for cabinets in accordance with
IEC 60297 and IEC 60917 series - Part 4: Cooling
performance tests for water supplied heat exchangers in
electronic cabinets**

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ICS 31.240

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**Mechanical structures for electronic equipment -
Thermal management for cabinets in accordance with IEC 60297 and IEC
60917 series -
Part 4: Cooling performance tests for water supplied heat exchangers in
electronic cabinets
(IEC 62610-4:2013)**

Structures mécaniques pour équipements électroniques – Gestion thermique pour les armoires conformes aux séries CEI 60297 et CEI 60917 – Partie 4: Essais de performances de refroidissement pour les échangeurs de chaleur alimentés par de l'eau dans des baies électroniques (CEI 62610-4:2013)

Mechanische Bauweisen für elektronische Einrichtungen - Wärmemanagement für Schränke nach den Reihen IEC 60297 und IEC 60917 - Teil 4: Kühlleistungsprüfungen für Wasser-Wärmetauscher in Elektronikschränken (IEC 62610-4:2013)

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Foreword

The text of document 48D/542/FDIS, future edition 1 of IEC 62610-4, prepared by SC 48D, "Mechanical structures for electronic equipment", of IEC TC 48, "Electromechanical components and mechanical structures for electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62610-4:2013.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2014-06-19
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2016-09-19

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Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

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

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60297	Series	Mechanical structures for electronic equipment - Dimensions of mechanical structures of the 482,6 mm (19 in) series	EN 60297	Series
IEC 60917	Series	Modular order for the development of mechanical structures for electronic equipment practices	EN 60917	Series

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INTRODUCTION

Electronic cabinets of the IEC 60297 and IEC 60917 series are used for the housing of electronic devices in many different fields of application. A wide field of application is represented by installations of communication networks with electronic devices in information technology (IT) environments. The classic way is to install rows of cabinets into defined foot print patterns and interconnect them via cables managed from overhead cable trays or raised floor cable management. So far, cooling has been facilitated by equipping the entire IT room with air conditioning in order to provide for air flow and air temperatures required for the safe operation of the electronic devices. With the growing heat load in data centers, this form of cooling has become more and more inefficient. Thermal problems with respect to high-performance electronic devices have become more difficult to solve. The environmental aspect is gaining crucial importance forcing us to cut down on wasting resources and to reduce CO₂ emissions.

Alternatives to the air conditioning of rooms need to be looked at more closely. Under the aspect of increasing cooling efficiency, there are some major concepts, two cases serve as examples here:

Case 1. The equipped group of cabinets, with dedicated temperature control.

This method is the cold aisles / hot aisles arrangement of a smaller number of cabinets, typically four to twelve. Its advantage over the air conditioning of rooms is the smaller air volume which allows a focused heat management with optimised dimensioning of power consumption for the cooling devices and increased temperatures in the warm zones of the room. In such cases, efficiency can be increased by adopting exhaust heat recovery for room heating in cold periods. Due to the improved energy efficiency contained aisles are becoming more and more popular.

Case 2. Single cabinets with water-air heat exchangers.

This method is used for cabinets accommodating high-performance/heat dissipating electronic equipment, typically servers and mainframe computers. Its advantage over the room air conditioning or cold aisles consists in the high degree of constant air inlet temperature for sensitive electronic devices. Closed air circulation within a cabinet allows a very precise temperature control. The power consumption aspect may be similar to that of the cold aisle, but the temperature control aspect is more important and favourable to a longer life-cycle of costly equipment.

This standard has been created for case 2: Cooling performance tests for water-supplied heat exchangers in single electronic cabinet configurations. The parameters with reference to the described test sample are shown in diagrams which may be useful to provide for a standardized calculation method for specific cabinet dimensions and heat exchanger cooling requirements. The typical required cooling capacity for such cabinets is normally higher than 12 kW. The described test methods of this standard address a cooling capacity of more than 12 kW. However, since IT equipment varies the heat load to a cabinet the test also considers values below 12 kW for partial heat load.

MECHANICAL STRUCTURES FOR ELECTRONIC EQUIPMENT – THERMAL MANAGEMENT FOR CABINETS IN ACCORDANCE WITH IEC 60297 AND IEC 60917 SERIES –

Part 4: Cooling performance tests for water supplied heat exchangers in electronic cabinets

1 Scope and object

This part of IEC 62610 specifies the test setup and test parameters for water supplied heat exchangers within single electronic cabinet configurations. The tests are focused on cabinets for the installation of high power dissipation electronic equipment. The cabinets concerned are from the IEC 60297 (19 in) and IEC 60917 (25 mm) series. The purpose of this standard is to provide comparable data for the cooling performance of cabinets according to defined test setups and cooling parameters.

2 Normative references

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

IEC 60297 (all parts), *Dimensions of mechanical structures of the 482,6 mm (19 in) series*

IEC 60917 (all parts), *Modular order for the development of mechanical structures for electronic equipment practices*

3 Terms and definitions, symbols and units

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1 cooling capacity

\dot{Q}

removed heat load given by the electronic equipment mounted inside the electronic cabinet [kW]

3.1.2 absolute humidity

mass content of water (gram of water) per defined mass of dry air (kilogram of air) [g/kg] g of water per kg dry air

3.1.3 dummy

device to generate heat load similar to most common electronic devices in information technology: horizontal air flow with air intake at the front and air outlet at the rear side of the equipment.