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Part 2: Engineering requirements for racks and cabinets**

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## **Foreword**

This European Telecommunication Standard (ETS) has been produced by the Equipment Engineering (EE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

This ETS is part 2 of a 4 part ETS, aimed at setting out on a common basis, the installation engineering requirements for telecommunication practice, housing equipment forming part of a public telecommunications network. Part 1 is a general introduction, and explains the terminology used. This part, Part 2, specifies the engineering requirements for racks and cabinets and Part 3 the engineering requirements for miscellaneous racks and cabinets. Part 4 covers engineering requirements for subracks in miscellaneous racks and cabinets.

This ETS applies to all telecommunication equipment forming part of public telecommunications network. The requirements for racks which this part lays down are based on the work of IEC Sub Committee 48D (see Annex B).

Illustrative figures are contained in Annex A.

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## 1 Scope

This part of European Telecommunication Standard (ETS) 300 119 details requirements for racks/cabinets which are supplied fully equipped. The racks/cabinets shall be used for housing telecommunication equipment forming part of a public telecommunication network installed either on the public telecommunication operators' sites, or in the premises of operator's customers.

Part 1 of this ETS (ETS 300 119-1 [3]) defines the meaning of rack or cabinet in the context of this ETS.

## 2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

- |     |  |
|-----|--|
| [1] | CEN/CENELEC EN 60 950 (1988): "Safety of information technology equipment, including electrical business equipment".   |
| [2] | Council Directive 89/336/EEC: "Approximation of the laws of the Member States relating to electromagnetic compatibility".  |
| [3] | ETS 300 119-1: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 1: Introduction and terminology".  |
| [4] | ETS 300 119-3: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 3: Engineering requirements for miscellaneous racks and cabinets".         |
| [5] | ETS 300 119-4: "Equipment Engineering (EE); European telecommunication standard for equipment practice Part 4: Engineering requirements for subracks in miscellaneous racks/cabinets". |
| [6] | ETS 300 019: "Equipment Engineering (EE); Environmental conditions and environmental tests for telecommunications equipment".  |

## 3 Coordination dimensions for racks/cabinets

### 3.1 Height

The height dimension (H) includes covers, feet or castors if these are an integral part of the rack/cabinet structure.

For telecommunication centres, H shall be 2 200 mm.

For customer sites, H may be at any preferred height, as defined in IEC Publication 917-2 (see Annex B), up to 2 200 mm. Provision shall be made for the possible fitment of height adaptors (for interfacing with overhead structures) as illustrated in Annex A, figure A.1.

The racks/cabinets shall also be provided with devices which can be height-adjusted to compensate for any unevenness in the floor. The scope for height adjustment shall be at least 25 mm. The nominal rack/cabinet height shall be measured when the adjustment devices are at their fully retracted positions.

### 3.2 Width

The width dimension (W) includes covers if they are an integral part of the rack/cabinet.

W shall be one of four permitted dimensions: 150 mm, 300 mm, 600 mm, or 900 mm.

The sides of any rack/cabinet shall not interfere with the assembly of adjacent racks/cabinets (into a straight line-up). The suppliers must ensure that the rack/cabinet will fit into the space between the grid lines, as illustrated in Annex A, figure A.3. Manufacturing tolerances shall therefore be so arranged that this objective will always be achieved, even when racks/cabinets are delivered from different suppliers.

NOTE: If additional equipment at the end(s) of a suite of racks/cabinets is required, the associated coordination dimensions shall be specified as an integer multiple of the mounting pitch of 25 mm for each side during equipment practice design and should be agreed between supplier and user.

### 3.3 Depth

The depth dimension (D) includes:

- a) doors or covers of the rack/cabinet if present;
- b) all protruding parts e.g. switches, lamps, hinges, locks, electrostatic discharge points, etc.;
- c) connectors, cabling, cooling fins, etc.

For the doors or covers, a minimum reference value for aisle width shall be 750 mm. Doors or covers which are in the open position shall protrude from the front/rear line of racks/cabinets by a maximum of 150 mm. Doors or covers shall be designed so that when open, they do not in any way restrict access to the equipment for essential maintenance and installation operations.

D shall be 300 mm or 600 mm.

## 4 Accessibility and line-up of racks/cabinets

Racks/cabinets of different depths may be used in the same rack/cabinet line-up, but the fronts of all the racks/cabinets shall then be aligned, as illustrated in Annex A, figure A.2.

Racks/cabinets with a depth of 300 mm shall be accessed only from the front, to allow them to be placed back-to-back or to the wall. The front of racks/cabinets arranged backwards shall be aligned to the rear line (see Annex A, figure A.2).

## 5 External cable access

The rack/cabinet design shall enable the cabling for the telecommunication equipment to be routed either over a cable support structure, or under a raised floor, as required, i.e. cable access must be provided in both top and bottom of the rack/cabinet.

Direct rack/cabinet-to-rack/cabinet cabling is also allowed within rows.

## 6 Heat dissipation

### 6.1 Rack/cabinet heat management

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

The design of any rack, cabinet or structure shall be such that when assembled into a fully-working entity, the relevant components are not subjected to temperatures which exceed the maximum quoted by the component suppliers.



This shall apply over the full operating room ambient temperature range selected from ETS 300 019 [6].

NOTE: Internal cabling is considered as a component.

## **6.2 Component temperature**

The supplier of the equipped rack/cabinet shall have available all the relevant component temperature information criteria, used to ensure that reliability targets are met. On request, the supplier shall be able to verify that the temperature criteria used for the design of a specific product have been met.

## **6.3 Room thermal planning**

On demand, the supplier shall provide administrations, operators or customers with the nominal total dissipation of the rack/cabinet and other relevant information for room thermal planning and management purposes.

# **7 Floor loading**

The maximum permissible rack/cabinet weight depends on the rack's/cabinet's floor area. To calculate weight per unit area in  $\text{kN/m}^2$ , the actual weight of the rack/cabinet should be divided by the floor area ( $W \times D$  of the rack/cabinet). The weight per unit area added by the overhead support structure and cabling is also calculated by using the floor area of the supporting rack/cabinet.

The arrangement of racks/cabinets has to be planned by the installer to ensure that the average floor loading for a building is not exceeded. This will be a lower value than the weight per unit area and will depend, for example, on the centre distance of the rack/cabinet rows.

## **7.1 Weight per unit area of fully equipped rack/cabinet**

For general applications, the weight per unit area of a fully equipped rack/cabinet, including internal cabling, etc. should not exceed  $15 \text{ kN/m}^2$ . The maximum allowed weight per unit area shall be  $20 \text{ kN/m}^2$ .

## **7.2 Weight per unit area of cable support structure and cabling**

The weight per unit area exerted by the relevant portions of the cable support structure with cabling, should usually not exceed  $3 \text{ kN/m}^2$ . The maximum allowed weight per unit area shall be  $8 \text{ kN/m}^2$ .

## **7.3 Point loading**

A point loading exerted by the base of the rack/cabinet on the floor shall not exceed  $490 \text{ N/cm}^2$ .

NOTE: Other values for point loading may be adopted by agreement between the supplier and customer.

# **8 Structural load on a rack/cabinet**

## **8.1 Static load**

The rack/cabinet shall be able to support a static load of the superstructure with cabling, as described in Clause 7.

## **8.2 Dynamic load**

During installation, the rack/cabinet shall be able to support an additional load of  $800 \text{ N}$  for a rack/cabinet of  $600 \times 600 \text{ mm}$  or greater; pro rata values shall apply to the other smaller racks/cabinets.

## **9      Temperatures limits**

### **9.1      Temperature of touchable parts**

The temperature rise of touchable parts shall be in accordance with EN 60 950 [1], table XIII part 2. These requirements are included to ensure the safety of personnel.

The specified temperature rises are based on the assumption that the room ambient temperature will be 25 °C when the equipment is in operation. If the equipment in final use is intended to be operated in a higher room ambient temperature, the limits of temperature rises shall be reduced by the difference between the higher ambient temperature and 25 °C.

### **9.2      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 shall not exceed 75 °C.

## **10      Dimensions of packaged rack/cabinet**

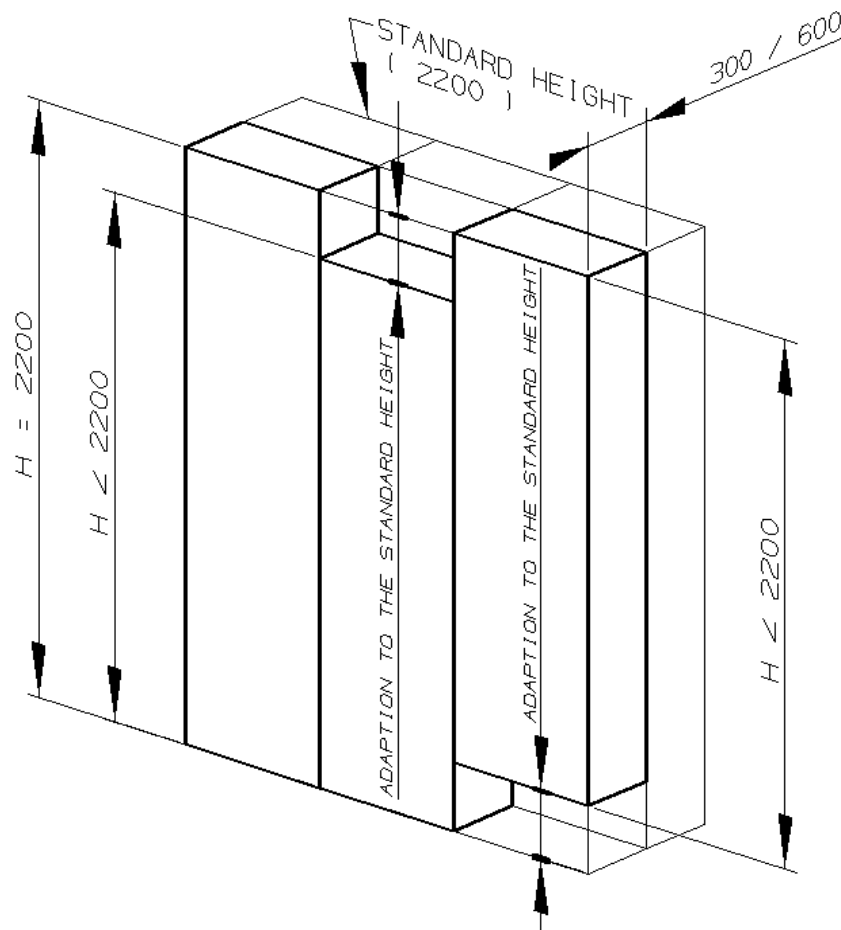
The maximum dimensions of a packaged rack/cabinet shall not exceed 2 500 mm x 1 200 mm x 900 mm.

These maximum dimensions are stated to allow transportation when using normal lifts, hallways and doors.

## **11      Electromagnetic compatibility and electrostatic discharge requirements**

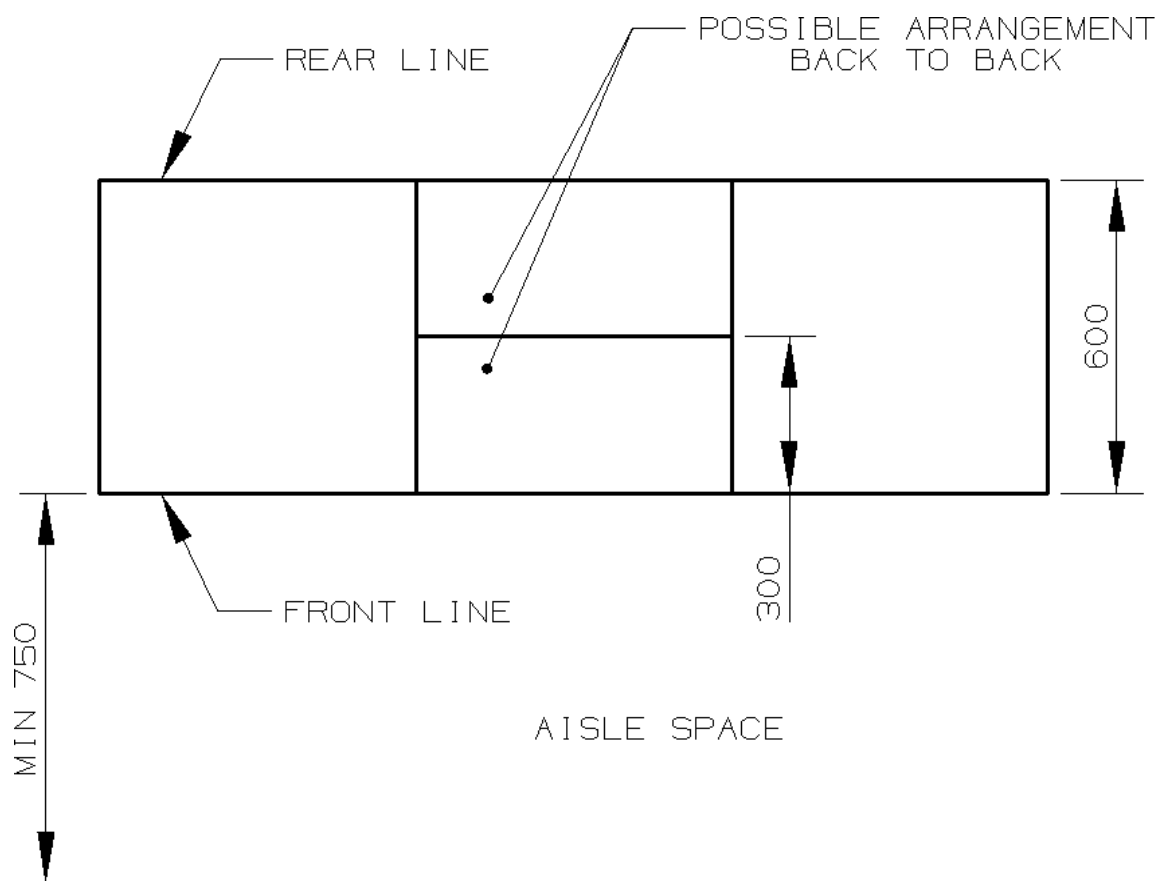
All new equipment designs must take account of the EEC Council Directive on the approximation of the laws of the Member States relating to electromagnetic compatibility (Directive 89/336/EEC [2]). In accordance with the terms of this Directive, due regard shall be taken of the appropriate existing and emerging standards concerning electromagnetic compatibility phenomena.

Annex A (informative): Illustrative figures



Dimensions in millimetres

Figure A.1: Combination of cabinets or rack structures of different height (example)



Dimensions in millimetres

**Figure A.2: Possible floor arrangement (example)**

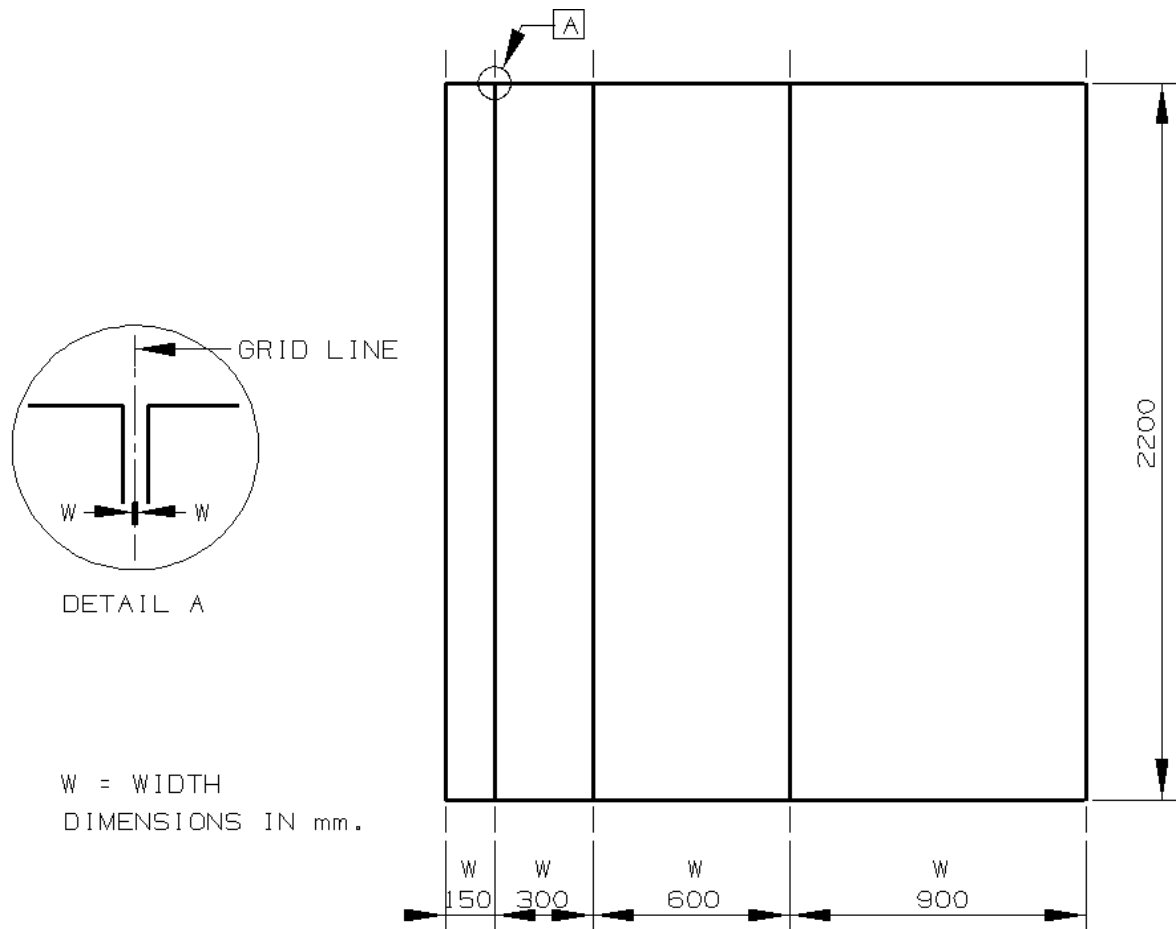


Figure A.3: Front view to racks/cabinets

**Annex B (informative): IEC Sub Committee 48D publication**

This ETS is based on the following standard:

"Modular order for the development of mechanical structures for electronic equipment practices. IEC 917-2:  
Sectional standard: Interface co-ordination dimensions for the 25 mm equipment practice".

IEC 917-2-2 is currently following approval procedure as IEC 48D(CO)32.

## History

Document history	
January 1994	First Edition
February 1996	Converted into Adobe Acrobat Portable Document Format (PDF)