



**Environmental Engineering (EE);
European telecommunication standard
for equipment practice;
Part 6: Engineering requirements for
harmonized racks and cabinets with extended features**

Reference

DEN/EE-0031

Keywords

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ETSI

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Foreword

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

The present document is part 6 of a multi-part deliverable aimed at setting out, on a common basis, the installation engineering requirements for telecommunication practice, for housing equipment forming part of a public telecommunications network.

ETSI EN 300 119-1 [i.1] is a general introduction and explains the terminology used. ETSI EN 300 119-2 [i.2] specifies the engineering requirements for racks and cabinets. ETSI EN 300 119-3 [i.3] specifies the engineering requirements for miscellaneous racks and cabinets. ETSI EN 300 119-4 [i.4] covers engineering requirements for subracks in miscellaneous racks and cabinets. ETSI EN 300 119-5 [i.5] covers the preferred thermal management solutions for subracks, racks/cabinets and miscellaneous racks/cabinets installed indoors in restricted access locations, for the removal of heat dissipated by one or more subracks in a rack complying to the requirements of this multi-part standard.

The present document, ETSI EN 300 119-6, is defining extension to the existing parts of the standard to harmonize dimensions and to extend rack installation capabilities.

These extended features are:

- mounting bracket depth adjustment only on subrack level (as normally done on many other standardized equipment practices; e.g. 19 inches)
- full installation compatibility for installing rack line-ups with 300 mm and 600 mm depth (see ETSI EN 300 119-3 [i.3])
- common position of mounting brackets for both 300 mm and 600 mm depth
- recessed subrack mounting plane compared to ETSI EN 300 119-3 [i.3] and ETSI EN 300 119-4 [i.4] to allow more room for cable management and better cable access from front/rear aisle
- modular design for 300 mm/600 mm racks to improve installation and thermal management (e.g. back-to-back with 200 mm off-set)
- split up of 600 mm deep footprint into 2x300 mm so that both rack types allow the same subrack fixation plane
- 300 mm and 600 mm deep racks with back-to-back installation compatibility for subracks (option to mount two 280 mm deep subracks back to back in a 600x600 mm footprint)
- 300 mm and 600 mm deep racks with detachable side/rear covers to allow full cable duct access from the side
- common 10 mm thick door design for both 300 mm and 600 mm rack to improve commonality
- design subrack mounting plane in a manner so that not only 600 mm deep rack is a earthquake proof design but also the 300 mm rack (600 mm: ~7 inches deep upright; 300 mm ~3,5 inches deep upright; commonality with EIA rack standard for SNBF)

- option for rack side extensions to create enhanced cabling space and thermal management options (e.g. heat exchangers for water cooling to gain best energy efficiency for IT infrastructure) for both rack types (300 mm and 600 mm depth)
- keep the rack side structure open with optional side plates to increase cabling space and reduce costs in rack line-ups (only first and last rack would need a side plate)
- make ETSI mounting principle similar to SNBF (5 inches deep upright) which is used in USA telecommunication offices to gain more commonality for international markets
- Seismic Proof Design (target: IEC 61587-2 [i.6]) for both 300 mm and 600 mm deep rack
- Define extra front side cabling space for accommodating optical and electrical I/O cables
- 300 mm/600 mm commonalities (e.g. doors, feet, rack alarm indicator strip, etc.) provide various options for cost reduction due to higher volume and cost reduction, lower CAPEX due to less complexity and simplified logistics for deployment

The present document applies to all telecommunication equipment forming part of the public telecommunications network.

The present document is part 6 of a multi-part deliverable. Full details of the entire series can be found in part 1 [i.1].

National transposition dates	
Date of adoption of this EN:	19 February 2015
Date of latest announcement of this EN (doa):	31 May 2015
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	30 November 2015
Date of withdrawal of any conflicting National Standard (dow):	30 November 2015

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document details requirements for racks and cabinets with extended features supplied unequipped. The racks/cabinets with extended features can 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. The racks/cabinets with extended features allow to accommodate various equipment, e.g. subracks (see ETSI EN 300 119-4 [i.4]) and have provisions for doors or covers.

ETSI EN 300 119-1 [i.1] defines the meaning of rack or cabinet in the context of the present document.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

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

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are necessary for the application of the present document.

- [1] IEC 60917-2-1: "Modular order for the development of mechanical structures for electronic equipment practices - Part 2: Sectional specification - Interface co-ordination dimensions for the 25 mm equipment practice - Section 1: Detail specification - Dimensions for cabinets and racks".

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long term validity.

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

- [i.1] ETSI EN 300 119-1: "Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 1: Introduction and terminology".
- [i.2] ETSI EN 300 119-2: "Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 2: Engineering requirements for racks and cabinets".
- [i.3] ETSI EN 300 119-3: "Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 3: Engineering requirements for miscellaneous racks and cabinets".
- [i.4] ETSI EN 300 119-4: "Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 4: Engineering requirements for subracks in miscellaneous racks and cabinets".
- [i.5] ETSI EN 300 119-5: "Environmental Engineering (EE); European telecommunication standard for equipment practice; Part 5: Thermal management".

- [i.6] IEC 61587-2: "Mechanical structures for electronic equipment - Tests for IEC 60917 and 60297 - Part 2: Seismic tests for cabinets and racks".
- [i.7] ECIA EIA/ECA-310-E: "Cabinets, Racks, Panels, and Associated Equipment".

3 Abbreviations

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

CAPEX	Capital Expenditure
EIA	Electronic Industries Alliance
IT	Information Technology
SNBF	Seismic Network Bay Frame

NOTE: Based on 23 inches EIA-310-E standard [i.7].

USA United States of America

4 Dimensions for miscellaneous racks/cabinets

4.1 Height

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

For telecommunication centres and customer sites, H shall be 2 200 mm.

The rack/cabinet with extended features shall have provision within its height for the attachment of parts for interfacing to any overhead structure.

The miscellaneous 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 miscellaneous rack/cabinet height shall be measured when the adjustment devices are at their fully retracted positions.

4.2 Width

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

W shall be 600 mm.

The sides of any rack/cabinet with extended features shall not interfere with the assembly of adjacent racks/cabinets (into a straight line-up). The suppliers shall ensure that the rack/cabinet with extended features will fit into the space between the grid lines, as illustrated in figure A.1. Manufacturing tolerances shall therefore be so arranged that this objective will always be achieved, even when miscellaneous racks/cabinets are delivered from different suppliers.

NOTE: If additional equipment at the end(s) of a suite of racks/cabinets with extended features is required the associated coordination dimensions should 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.

4.3 Depth

The depth dimension (D) includes:

- a) doors or covers of the rack/cabinet structure with extended features if present;
- b) protruding parts e.g. switches, lamps, hinges, locks, electro-static 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 miscellaneous 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 in that rack or cabinet.

D shall be 300 mm or 600 mm.

4.4 Other dimensions

For other dimensions of the miscellaneous rack/cabinet, see table 1 and refer to figures A.4 and A.5.

5 Accessibility and line-up of miscellaneous racks/cabinets

Racks/cabinets with extended features of different depths may be used in any rack/cabinet line-up, but the front line of all racks/cabinets shall be aligned as illustrated in figure A.2 or A.3. 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 line of miscellaneous racks/cabinets arranged back to back shall be aligned to the rear line (see figure A.2 or A.3).

6 Floor loading

The maximum permissible miscellaneous rack/cabinet weight depends on the miscellaneous rack's/cabinet's floor area. To calculate weight per unit area in kN/m^2 , the actual weight of the miscellaneous 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 miscellaneous rack/cabinet.

The arrangement of racks/cabinets with extended features 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.

6.1 Weight per unit area of fully equipped miscellaneous rack/cabinet

For general applications the weight per unit area fully equipped rack/cabinet with extended features, including internal cabling, etc., should not exceed 15 kN/m^2 . The maximum allowed weight per unit area shall be 20 kN/m^2 .

6.2 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 kN/m^2 . The maximum allowed weight per unit area shall be 8 kN/m^2 .

6.3 Point loading

A point loading exerted by the base of the fully equipped rack/cabinet with extended features on the floor shall not exceed 490 N/cm^2 .

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

7 Structural load on a miscellaneous rack/cabinet

7.1 Static load

The miscellaneous rack/cabinet shall be able to support a static load of the superstructure with cabling, as described in clause 6.

7.2 Dynamic load

During installation, the miscellaneous rack/cabinet shall support an additional load of 800 N for a miscellaneous rack/cabinet of 600 mm × 600 mm and 400 N for a miscellaneous rack/cabinet of 600 mm × 300 mm.

8 External cable access

The rack/cabinet design with extended features 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 shall be provided in both top and bottom of the rack/cabinet with extended features. Since the complete cabling space is in front of the mounting uprights there is full access to the cabling space guaranteed in all installation scenarios.

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

External cables shall be located in the area on the left and right hand sides of the rack/cabinet with extended features, between the subrack and rack/cabinet structure.

The minimum area for cable shall be 10 000 mm² on each side. This figure is based on the use of a 500 mm wide subrack. The area available will increase when a 450 mm wide subrack is installed.

9 Dimensions of packaged rack/cabinet with extended features

The maximum dimensions of a packaged miscellaneous rack/cabinet shall not exceed:

$$2\,500\text{ mm} \times 1\,200\text{ mm} \times 900\text{ mm}$$

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

NOTE: See also figures A.4 and A.5 where dimensions are in mm.

Table 1

Dimensions for miscellaneous racks/cabinets	(see note 3)	600 x 300	600 x 600
H = height	C	2 200	2 200
W = width	C	600	600
D = depth (see note 5)	C	300	600
H1 = mounting height aperture	C	2 000 (see note 1)	
W1 = mounting width aperture	C	535	535
W2 = aperture between mounting flanges	C	500	500
W3 = mounting centre distance e.g. for subracks	A	515	515
D1 = mounting depth aperture (front) (see note 6)	C	200	200
D2 = mounting depth aperture (rear) see note 6)	C	80	375
R = mounting position	C	12,5	12,5
S = mounting pitch	A	25	25
F = fastening points	A	(see note 2)	
D3 = mounting depth aperture i.e. for possible front cover/door (see note 4)	C	10	10
D4 = mounting depth aperture i.e. for possible rear cover/door (see notes 4 and 5)	C	5	10
<p>NOTE 1: Rack/cabinet designs of aperture height $2\,000 + n \times 25$ are allowed, but are not a requirement.</p> <p>NOTE 2: Fastening points, metric screw thread M6 to be used.</p> <p>NOTE 3: A = Actual dimension. Tolerances needed for W3 and S shall be as specified in IEC 60917-2-1 [1]. C = Coordination dimension.</p> <p>NOTE 4: Depth D3 applies to aperture width W1. Depth D4 applies to aperture width W2.</p> <p>NOTE 5: The difference, 5 mm, between D, 300 mm, and the sum of D1, D2, D3 and D4, 295 mm, is the allowance for rack/cabinet construction, manufacturing tolerances and clearance for installing subracks. A similar explanation applies to the 600 mm deep miscellaneous rack/cabinet.</p> <p>NOTE 6: Both rack/cabinet depths 300/600 mm have a common mounting flange position. The same applies for a 600 mm deep rack, where there is a subrack mounting from front and rear possible and also for two 300 mm racks installed back to back in a rack line-up.</p> <p>Definition: A coordination dimension is a reference dimension used to coordinate mechanical interfaces. This is not a manufacturing dimension with a tolerance. An aperture dimension is a special coordination dimension for a usable space between features. An actual outside dimension corresponding to a coordination dimension can only decrease. An actual inside dimension corresponding to an aperture dimension can only increase.</p>			

Annex A (informative): Illustrative figures

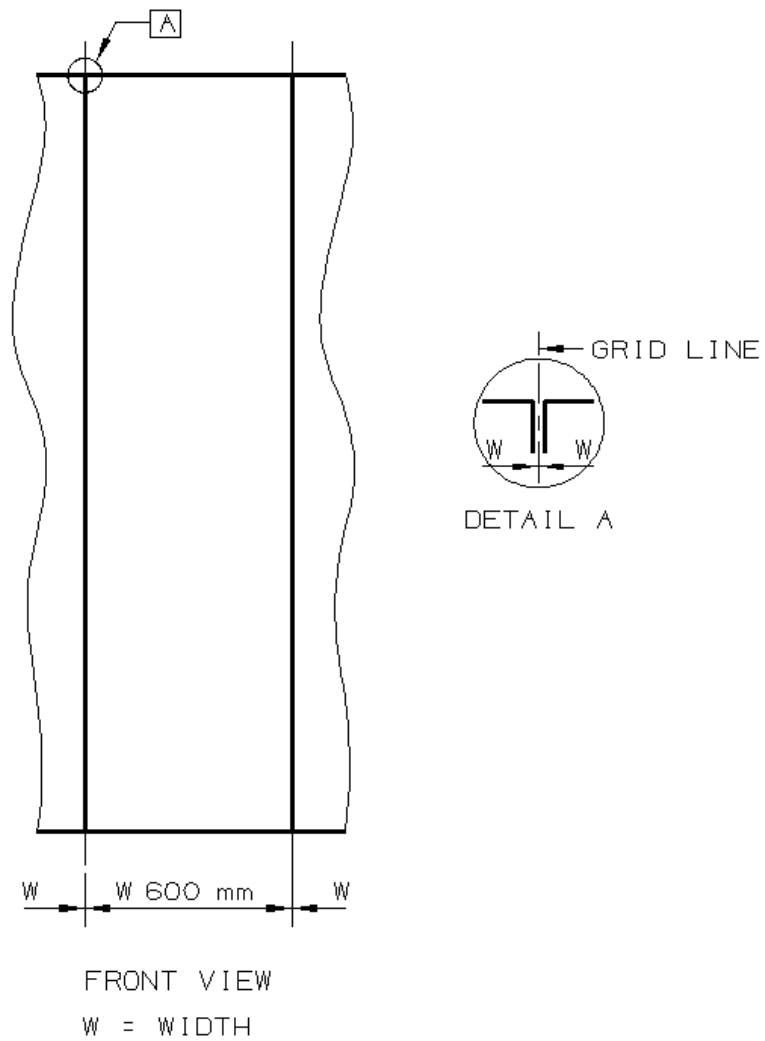


Figure A.1

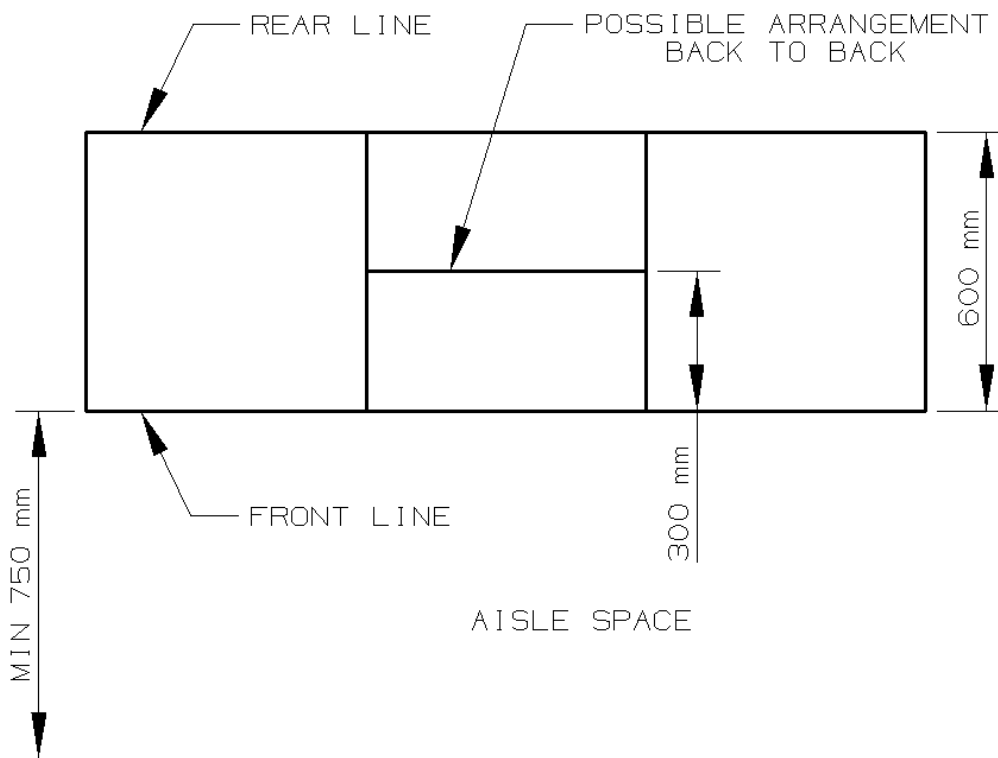


Figure A.2: Possible floor arrangement (example)

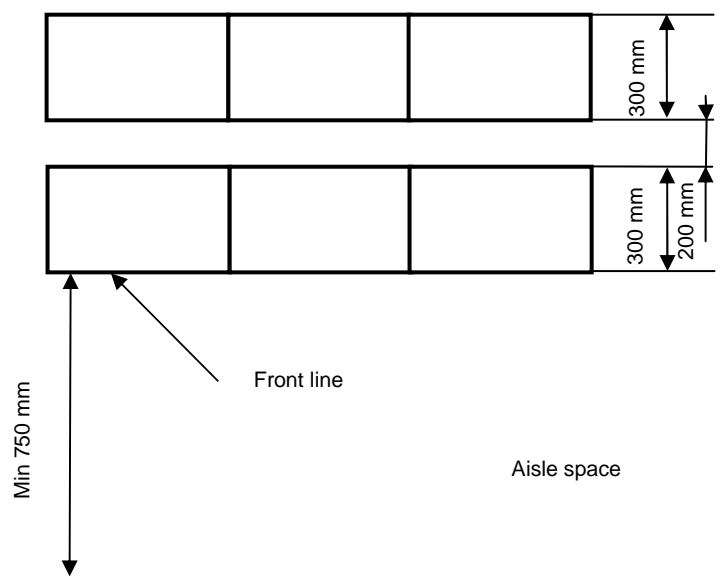


Figure A.3: Possible floor arrangement for 300 mm dept rack/cabinet to improve the cooling (example)

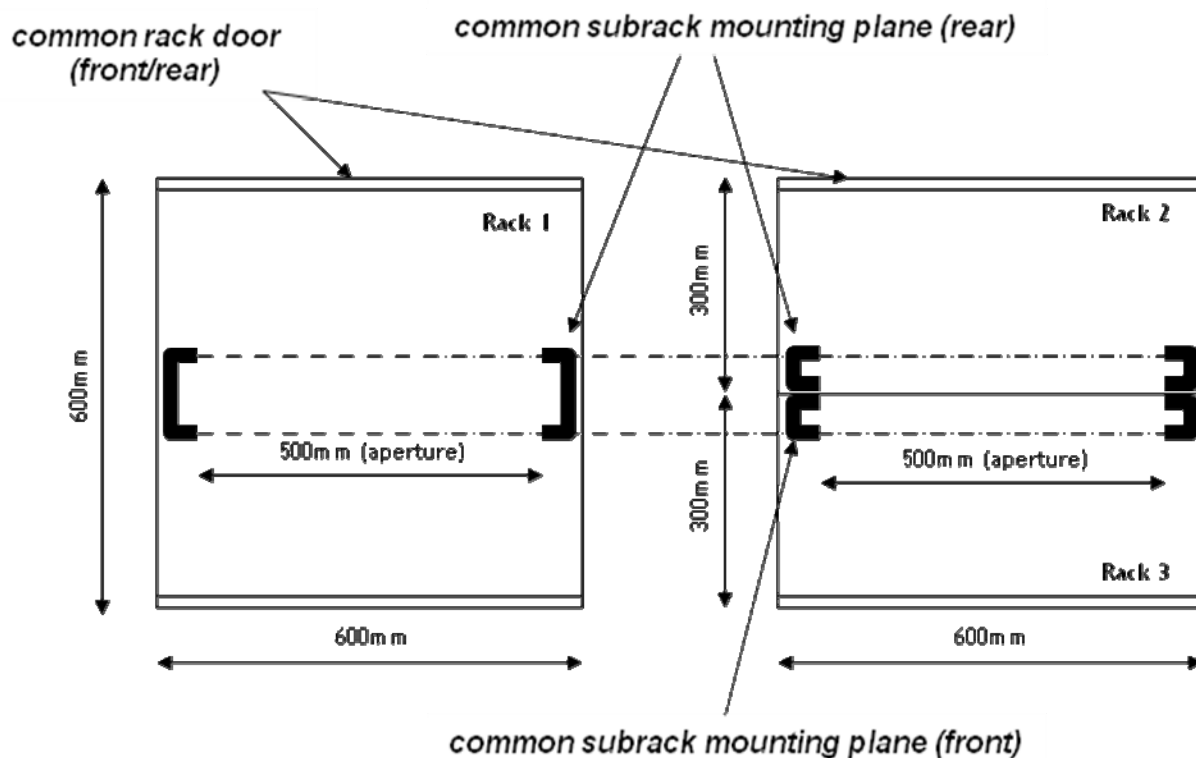


Figure A.4: Rack Harmonization for 300 mm and 600 mm deep Rack/Cabinet

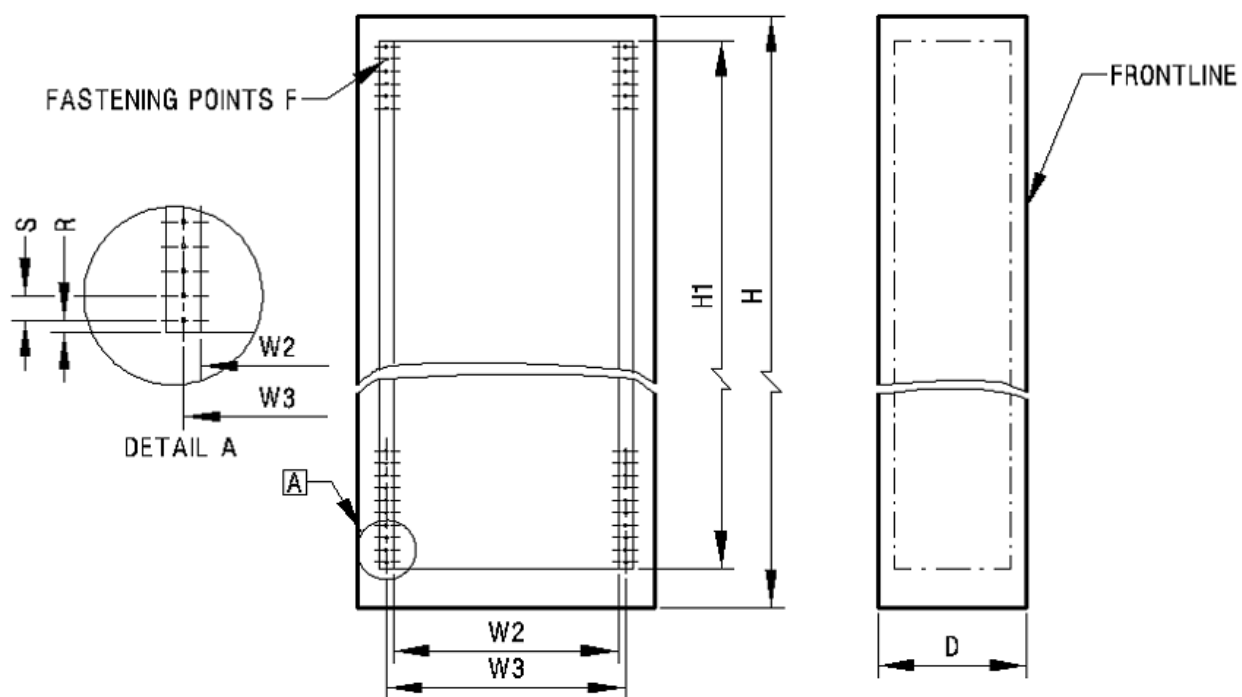
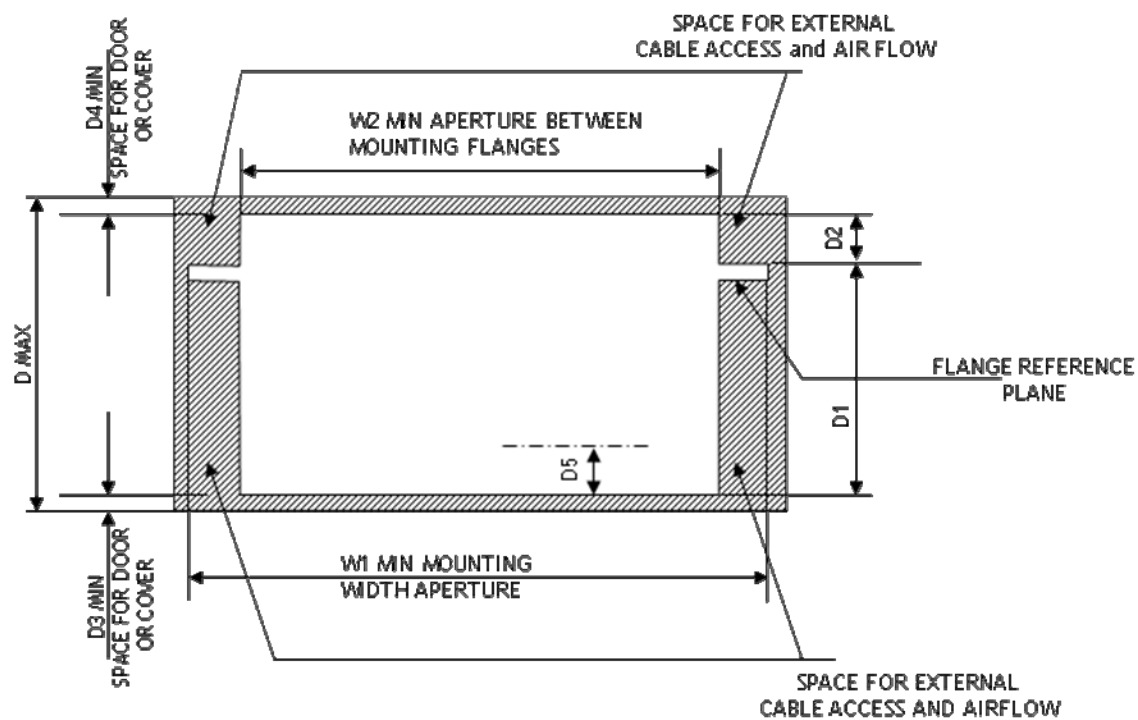


Figure A.5: Mounting Apertures for Harmonized Rack/Cabinet



D5 = SPACE FOR CABLE MANAGEMENT ($>60\text{mm}$ RECOMMENDED)

NOTE: *: Space to be available for equipment, e.g. subracks.

Figure A.6: Harmonized 300 mm Rack/Cabinet with extended Features

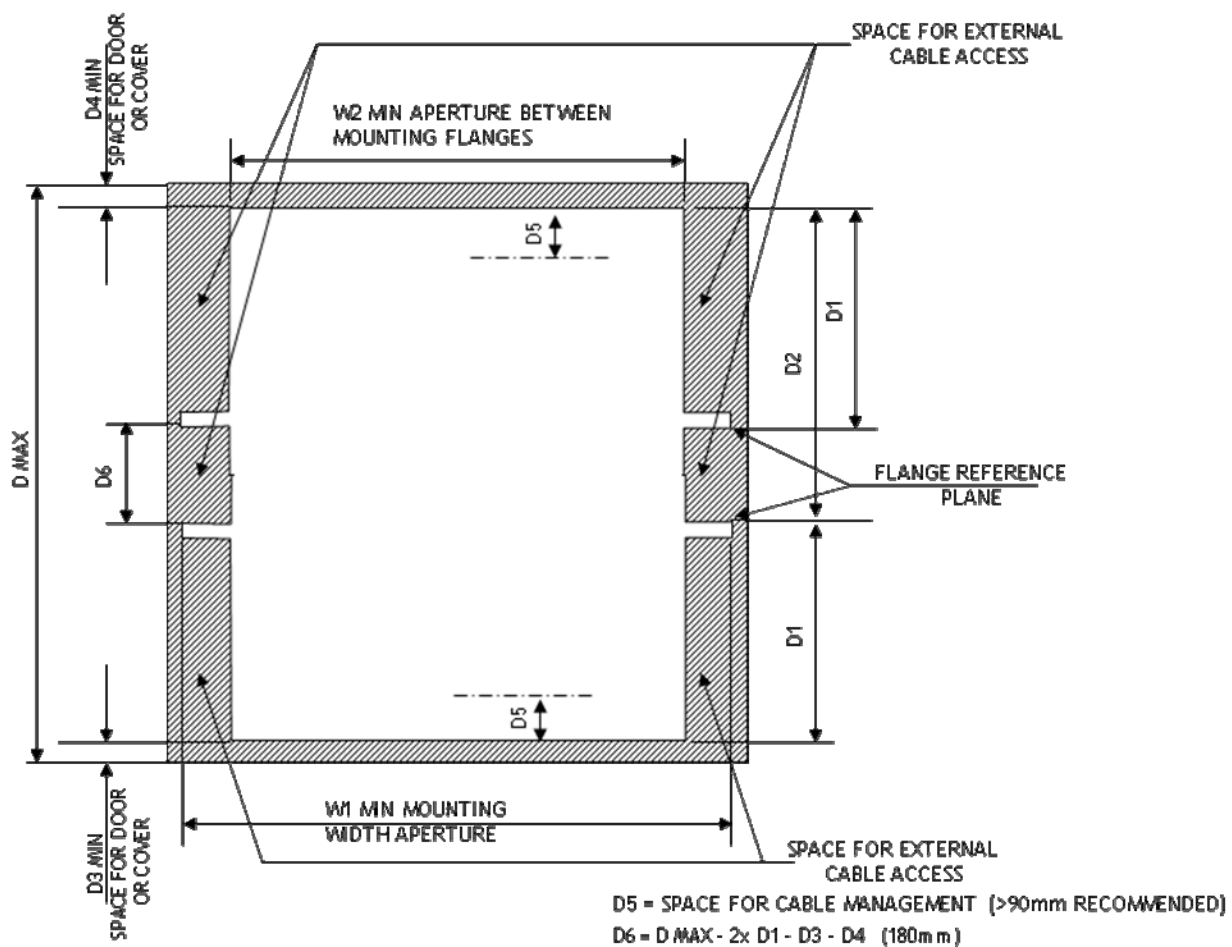


Figure A.7: Harmonized 600 mm Rack/Cabinet with extended Features

History

Document history		
V1.0.0	October 2014	EN Approval Procedure AP 20150219: 2014-10-22 to 2015-02-19
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