ATIS-0600336.2020

Design Requirements for Universal Cabinets and Framework

AMERICAN NATIONAL STANDARD FOR TELECOMMUNICATIONS

As a leading technology and solutions development organization, the Alliance for Telecommunications Industry Solutions (ATIS) brings together the top global ICT companies to advance the industry's most pressing business priorities. ATIS' nearly 200 member companies are currently working to address the All-IP transition, 5G, network functions virtualization, big data analytics, cloud services, device solutions, emergency services, M2M, cyber security, network evolution, quality of service, billing support, operations, and much more. These priorities follow a fast-track development lifecycle — from design and innovation through standards, specifications, requirements, business use cases, software toolkits, open source solutions, and interoperability testing.

ATIS is accredited by the American National Standards Institute (ANSI). The organization is the North American Organizational Partner for the 3rd Generation Partnership Project (3GPP), a founding Partner of the oneM2M global initiative, a member of the International Telecommunication Union (ITU), as well as a member of the Inter-American Telecommunication Commission (CITEL). For more information, visit www.atis.org.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires review by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made towards their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken periodically to reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Notice of Disclaimer & Limitation of Liability

The information provided in this document is directed solely to professionals who have the appropriate degree of experience to understand and interpret its contents in accordance with generally accepted engineering or other professional standards and applicable regulations. No recommendation as to products or vendors is made or should be implied.

NO REPRESENTATION OR WARRANTY IS MADE THAT THE INFORMATION IS TECHNICALLY ACCURATE OR SUFFICIENT OR CONFORMS TO ANY STATUTE, GOVERNMENTAL RULE OR REGULATION, AND FURTHER, NO REPRESENTATION OR WARRANTY IS MADE OFMERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OR AGAINST INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. ATIS SHALL NOT BE LIABLE, BEYOND THE AMOUNT OF ANY SUM RECEIVED IN PAYMENT BY ATIS FOR THIS DOCUMENT, AND IN NO EVENT SHALL ATIS BE LIABLE FOR LOST PROFITS OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES. ATIS EXPRESSLY ADVISES THAT ANY AND ALL USE OF OR RELIANCE UPON THE INFORMATION PROVIDED IN THIS DOCUMENT IS AT THE RISK OF THE USER.

NOTE - The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights. By publication of this standard, no position is taken with respect to whether use of an invention covered by patent rights will be required, and if any such use is required no position is taken regarding the validity of this claim or any patent rights in connection therewith. Please refer to [http://www.atis.org/legal/patentinfo.asp] to determine if any statement has been filed by a patent holder indicating a willingness to grant a license either without compensation or on reasonable and non-discriminatory terms and conditions to applicants desiring to obtain a license.

ATIS-0600336.2020, *Design Requirements for Universal Cabinets and Framework*
Is an American National Standard developed by the ATIS **Network Physical Protection (NPP)** Subcommittee under the **ATIS Sustainability in Telecom: Energy and Protection Committee (STEP)**.

Published by
Alliance for Telecommunications Industry Solutions
1200 G Street, NW, Suite 500
Washington, DC 20005

ATIS-0600336.2020

(Revision of ATIS-0600336.2015)

American National Standard for Telecommunications

Design Requirements for Universal Cabinets and Framework

Alliance for Telecommunications Industry Solutions

Approved October 30, 2020

American National Standards Institute, Inc.

Abstract

This standard, when used with established sheet metal manufacturing practices, sets forth the dimensional parameters, performance requirements, and acceptance criteria for the manufacture and availability of equipment frames for housing electronic equipment as used in communications networks. These frames are intended to be installed in communication carrier spaces. The cabinets and framework described will be designed to common dimensional footprints, have greater performance for handling larger, heavier equipment and dimensional parameters that may be used for designing future communications equipment. The cabinets and framework described are to be available as general-purpose products for use by those electronic equipment manufacturers and service providers that do not design and manufacture their own proprietary cabinets and framework.

Foreword

The information contained in this Foreword is not part of this American National Standard (ANS) and has not been processed in accordance with ANSI's requirements for an ANS. As such, this Foreword may contain material that has not been subjected to public review or a consensus process. In addition, it does not contain requirements necessary for conformance to the Standard.

The Alliance for Telecommunication Industry Solutions (ATIS) serves the public through improved understanding between providers, customers, and manufacturers. The Sustainability in Telecom: Energy and Protection (STEP) Committee – formerly the Network Interface, Power, and Protection Committee (NIPP) -- engages industry expertise to develop standards and technical reports for telecommunications equipment and environments in the areas of energy efficiency, environmental impacts, power and protection. The work products of STEP enable vendors, operators and their customers to deploy and operate reliable, environmentally sustainable, energy efficient communications technologies. STEP is committed to proactive engagement with national, regional and international standards development organizations and forums that share its scope of work.

This standard, when used with established sheet metal manufacturing practices, sets forth dimensional parameters, performance requirements, and acceptance criteria for the manufacture and availability of equipment frames used to house new heavier and deeper telecommunications equipment. These frames are intended for installation in telecommunications and data equipment buildings and facilities. The purpose of this standard is to establish common dimensional footprint for Universal Cabinets and Framework (UCF), provide a stronger frame for handling larger, heavier equipment and to establish design parameters for developing future telecommunications equipment. The UCF should be available as a general-purpose product for use by those electronic equipment manufacturers that do not design and manufacture their own proprietary framework. The UCF should be available to service providers that require a common dimensioned UCF for housing electronic equipment from a variety of manufacturers.

This standard contains two annexes that are informative and not considered part of this standard.

ANSI guidelines specify two categories of requirements: mandatory and recommendation. The mandatory requirements are designated by the word SHALL and recommendations by the word SHOULD. Where both a mandatory requirement and a recommendation are specified for the same criterion, the recommendation represents a goal currently identifiable as having distinct compatibility or performance advantages.

Suggestions for improvement of this document are welcome. They should be sent to the Alliance for Telecommunications Industry Solutions, STEP 1200 G Street NW, Suite 500, Washington, DC 20005.

At the time of consensus on this document, STEP, which was responsible for its development, had the following roster:

E. Gallo, STEP Chair (Ericsson)

J. Fuller, STEP Vice-Chair (AT&T)

C. Von Hagel, NPP Chair (Intertek)

C. Forbes, NPP Vice Chair (NTS)

The Network Physical Protection (NPP) Subcommittee was responsible for the development of this document.

Table of Contents

1 SCOPE, PURPOSE, APPLICATION, & INTENT 1

1.1 SCOPE 1
1.2 PURPOSE 1
1.3 APPLICATION 2
1.4 INTENT 2

2 REFERENCES 3

2.1 NORMATIVE 3
2.2 INFORMATIVE 3

3 DEFINITIONS 3

4 PERFORMANCE REQUIREMENTS 4

4.1 UCF PERFORMANCE 4
4.2 STATIC TESTS 4
4.2.1 Test Requirements 5
4.2.2 Data Requirements 5
4.2.3 Test Procedure 5
4.2.4 Test Results 6
4.3 DYNAMIC TESTS 6

5 PHYSICAL REQUIREMENTS 6

5.1 GENERAL REQUIREMENTS 6
5.2 FIRE RESISTANCE 7
5.3 FINISH 7
5.4 HEAT DISSIPATION 7
5.5 RAISED FLOOR SYSTEM CONFIGURATIONS 8
5.6 GEOMETRIC DIMENSIONS 8
5.6.1 Height Dimension 8
5.6.2 Depth Dimension 8
5.6.3 Width Dimension 9
5.6.4 Inside Dimensions (Equipment Mounting Dimensions) 9
5.7 EQUIPMENT LINE-UP CONFORMITY 10
5.7.1 Junction Details (for junction kits see Clause 8.4) 10
5.7.2 Anchoring to a Floor (for anchor kits see Clause 8.2) 10
5.7.3 Leveling Devices 11
5.7.4 Lifting Points 11
5.7.5 Frame Ground 11
5.7.6 Isolation (for isolation materials see Clause 8.6) 11
5.7.7 ESD/Jack, Location 12

6 CABLE AREAS 12

6.1 CABLE ACCESS 12
6.2 EQUIPMENT FRAME INTERFACE WITH CABLE RACK 12
6.3 UCF CABLE DISTRIBUTION UNDER RAISED FLOOR 12
6.3.1 Location of Cable Entry (Access Floor) 13
6.4 AC CONVENIENCE OUTLET 13

7 UNDER FLOOR AIR ENTRY & PATH 13

8 ACCESSORIES 13

8.1 UCF DOOR & SIDE PANEL 13
8.2 ANCHOR KITS 14
8.3 END GUARDS 14
8.4 JUNCTION KITS 14

8.5 Isolation Materials 14
8.6 Extenders 15
8.7 UCF - Frame Transport System (FTS) 15

9 FIGURES 16

ANNEX A: ENVIRONMENTAL & SPATIAL CONSIDERATIONS 29

A.1 Equipment Environment 29
A.2 Floor Planning Strategies 29
A.2.1 Office Space Planning 29
A.2.2 Network Equipment in Remote Locations 30

ANNEX B: FRAMEWORK DESIGN & USAGE 31

B.1 Legacy Frameworks 31
B.1.1 Design 31
B.2 Data Cabinets 32
B.2.1 Data Cabinet Dimension 32
B.3 Distributing & Interconnecting Frames 32
B.3.1 Distributing Frames 32
B.4 Fiber Distributing Frame (FDF) 33

Table of Figures

Figure 9.1. a - Hydraulic Cylinder Configuration 16
Figure 9.2. b - Hanging Weight Configuration 16
Figure 9.3. c - Lateral Load Frame Deflection Measurement 17
Figure 9.4. d - Lateral Load Front and Back Axis Deflection Measurement 17
Figure 9.5. e - Vertical Load Frame Bowing Measurement 18
Figure 9.6 - Outer Dimensions 18
Figure 9.7 - Modular Alignment 19
Figure 9.8 - Inner Spaces 20
Figure 9.9. a - Heat Dissipation - Suggested Areas for Air Movement in the UCF (Cabinetized version of the UCF) 26
Figure 9.10. b - Heat Dissipation - Telecom Facility Equipment Cooling Scheme 26
Figure 9.11 - Shelf Mounting Arrangements 27
Figure 9.12. a - Junction Details - Top (Frame to Frame) 27
Figure 9.13. b - Junction Details - End Guard (attachment points) 28
Figure 9.14 - Rating Label 28

Table of Tables

Table 9.1 - Dimensions of Legacy Framework (2-pole) 21
Table 9.2 - Dimensions if UCF is 600 mm (23.62") Wide 22
Table 9.3 - Dimensions if UCF is 750 mm (29.52") Wide 23
Table 9.4 - Dimensions if UCF is 900 mm (35.43") Wide 24

American National Standard
for Telecommunications –

Design Requirements for Universal Cabinets and Framework

1 Scope, Purpose, Application, & Intent

1.1 Scope

This standard sets forth the dimensional parameters, performance, and the application criteria for the UCF when used to house electronics and optical equipment in communication carrier spaces. The requirements shall be used in the design, construction, and provisioning of UCF supplied to the communications industry to house electronics equipment.

1.2 Purpose

The purpose of this document is to establish requirements for general-purpose equipment UCF with industry compatible dimensions and minimum performance capabilities. The UCF shall provide consistent external dimensions for planning and engineering equipment areas in the communications carrier space.

UCF manufacturers will utilize the requirements for designing and providing communications providers and suppliers with industry-compatible UCF. Electronic equipment manufacturers will utilize dimensional parameters in the development of products to be housed in the UCF. Integrators will utilize the framework to supply systems composed of either their own equipment or third-party equipment to service providers. Service providers may plan telecom facility equipment areas based on the UCF dimensions. Minimum performance parameters have been developed for the UCF to assure consistent load carrying capabilities and resistance to external loads. The UCF provides protection for equipment and front/rear cabling from aisle traffic by establishing consistent external dimensions. Minimum safety parameters are established to reduce overturning risks of loaded frames. Equipment cooling airflow patterns are discussed in the design and construction of the UCF. Other details covered by these requirements include internal cable management and support requirements, cable entry, junctioning details to adjacent UCF, and securing of UCF.

These requirements will:

- Be used with present and future network equipment.
- Provide improved compatibility between equipment suppliers' products.
- Provide cable management guidelines.
- Establish minimum physical performance parameters.
- Improve the hardware installation accessibility.
- Establish cooling air path protocol.
- Establish dimensional design parameters for housed equipment.