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STANDARD

ANSI/ASHRAE Standard 135.1-2019
(Supersedes ANSI/ASHRAE Standard 135.1-2013)

Method of Test for Conformance to BACnet®

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CONTENTS
ANSI/ASHRAE Standard 135.1-2019
Method of Test for Conformance to BACnet®

CLAUSE **PAGE**

FOREWORD 4
1. PURPOSE 5
2. SCOPE 5
3. DEFINITIONS 5
4. ELECTRONIC PICS FILE FORMAT 5
4.1 Character Encoding 5
4.2 Structure of EPICS Files 6
4.3 Character Strings 7
4.4 Notational Rules for Parameter Values 7
4.5 Sections of the EPICS File 8
5. EPICS CONSISTENCY TESTS 14
6. CONVENTIONS FOR SPECIFYING BACnet CONFORMANCE TESTS 16
6.1 TCSL Components 16
6.2 TCSL Statements 17
6.3 Time Dependencies 22
6.4 BACnet References 23
6.5 TD Requirements 23
7. OBJECT SUPPORT TESTS 24
7.1 Read Support for Properties in the Test Database 24
7.2 Write Support for Properties in the Test Database 26
7.3 Object Functionality Tests 28
8. APPLICATION SERVICE INITIATION TESTS 190
8.1 AcknowledgeAlarm Service Initiation Tests 190
8.2 ConfirmedCOVNotification Service Initiation Tests 191
8.3 UnconfirmedCOVNotification Service Initiation Tests 200
8.4 ConfirmedEventNotification Service Initiation Tests 203
8.5 UnconfirmedEventNotification Service Initiation Tests 245
8.6 GetAlarmSummary Service Initiation Tests 265
8.7 GetEnrollmentSummary Service Initiation Tests 266
8.8 GetEventInformation Service Initiation Tests 267
8.9 LifeSafetyOperation Service Initiation Tests 269
8.10 SubscribeCOV Service Initiation Tests 270
8.11 SubscribeCOVProperty Service Initiation Tests 271
8.12 AtomicReadFile Service Initiation Tests 272
8.13 AtomicWriteFile Service Initiation Tests 272
8.14 AddListElement Service Initiation Tests 273
8.15 RemoveListElement Service Initiation Tests 274
8.16 CreateObject Service Initiation Tests 274
8.17 DeleteObject Service Initiation Tests 275
8.18 ReadProperty Service Initiation Tests 275
8.19 ReadPropertyConditional Service Initiation Tests 277
8.20 ReadPropertyMultiple Service Initiation Tests 278
8.21 ReadRange Service Initiation Tests 280
8.22 WriteProperty Service Initiation Tests 284
8.23 WritePropertyMultiple Service Initiation Tests 286
8.24 DeviceCommunicationControl Service Initiation Tests 289
8.25 ConfirmedPrivateTransfer Service Initiation Test 290
8.26 UnconfirmedPrivateTransfer Service Initiation Test 290
8.27 ReinitializeDevice Service Initiation Tests 291
8.28 ConfirmedTextMessage Service Initiation Tests 291

This is a preview of "ANSI/ASHRAE Standard...". Click here to purchase the full version from the ANSI store.

8.29 UnconfirmedTextMessage Service Initiation Tests ... 292
8.30 TimeSynchronization Service Initiation Tests ... 293
8.31 UTCTimeSynchronization Service Initiation Tests ... 294
8.32 Who-Has Service Initiation Tests ... 294
8.33 I-Have Service Initiation Tests ... 295
8.34 Who-Is Service Initiation Tests ... 295
8.35 I-Am Service Initiation Tests ... 296
8.36 VT-Open Service Initiation Tests ... 296
8.37 VT-Close Service Initiation Tests ... 297
8.38 VT-Data Service Initiation Tests ... 298
8.39 RequestKey Service Initiation Tests ... 300
8.40 Authenticate Service Initiation Tests ... 301
9. APPLICATION SERVICE EXECUTION TESTS ... 305
9.1 AcknowledgeAlarm Service Execution Tests ... 305
9.2 ConfirmedCOVNotification Service Execution Tests ... 331
9.3 UnconfirmedCOVNotification Service Execution Tests ... 335
9.4 ConfirmedEventNotification Service Execution Tests ... 337
9.5 UnconfirmedEventNotification Service Execution Tests ... 341
9.6 GetAlarmSummary Service Execution Tests ... 341
9.7 GetEnrollmentSummary Service Execution Tests ... 342
9.8 GetEventInformation Service Execution Tests ... 346
9.9 LifeSafetyOperation Service Execution Test ... 349
9.10 SubscribeCOV Service Execution Tests ... 350
9.11 SubscribeCOVProperty Service Execution Tests ... 358
9.12 AtomicReadFile Service Execution Tests ... 366
9.13 AtomicWriteFile Service Execution Tests ... 372
9.14 AddListElement Service Execution Tests ... 383
9.15 RemoveListElement Service Execution Tests ... 385
9.16 CreateObject Service Execution Tests ... 387
9.17 DeleteObject Service Execution Tests ... 391
9.18 ReadProperty Service Execution Tests ... 393
9.19 ReadPropertyConditional Service Execution Tests ... 395
9.20 ReadPropertyMultiple Service Execution Tests ... 396
9.21 ReadRange Service Execution Tests ... 404
9.22 WriteProperty Service Execution Tests ... 414
9.23 WritePropertyMultiple Service Execution Tests ... 419
9.24 DeviceCommunicationControl Service Execution Test ... 428
9.25 ConfirmedPrivateTransfer Service Execution Tests ... 434
9.26 UnconfirmedPrivateTransfer Service Execution Tests ... 435
9.27 ReinitializeDevice Service Execution Tests ... 435
9.28 ConfirmedTextMessage Service Execution Tests ... 438
9.29 UnconfirmedTextMessage Service Execution Tests ... 439
9.30 TimeSynchronization Service Execution Tests ... 439
9.31 UTCTimeSynchronization Service Execution Tests ... 441
9.32 Who-Has Service Execution Tests ... 441
9.33 Who-Is Service Execution Tests ... 448
9.34 VT-Open Service Execution Tests ... 451
9.35 VT-Close Service Execution Tests ... 453
9.36 VT-Data Service Execution Tests ... 454
9.37 RequestKey Service Execution Test ... 454
9.38 Authenticate Service Execution Tests ... 456
9.39 General Testing of Service Execution ... 460
10. NETWORK LAYER PROTOCOL TESTS ... 462
10.1 General Network Layer Tests ... 462
10.2 Router Functionality Tests ... 463
10.3 Half-Router Functionality Tests ... 487

This is a preview of "ANSI/ASHRAE Standard...". Click here to purchase the full version from the ANSI store.

10.4 B/IP PAD Tests 494
10.5 Initiating Network Layer Messages 496
10.6 Non-Router Functionality Tests 498
10.7 Route Binding Tests 500
10.8 Virtual Routing Functionality Tests 505
11. LOGICAL LINK LAYER PROTOCOL TESTS 524
11.1 UI Command and Response 524
11.2 XID Command and Response 524
11.3 TEST Command and Response 525
12. DATA LINK LAYER PROTOCOLS TESTS 527
12.1 MS/TP State Machine Tests 527
12.2 PTP State Machine Tests 591
13. SPECIAL FUNCTIONALITY TESTS 630
13.1 Segmentation 630
13.2 Time Master 639
13.3 Character Sets 644
13.4 Malformed PDUs 644
13.5 Slave Proxy Tests 646
13.6 Automatic Network Mapping 648
13.7 Automatic Device Mapping 649
13.8 Backup and Restore Procedure Tests 649
13.9 Application State Machine Tests 661
13.10 Workstation Scheduling Tests 662
14. BACnet/IP Functionality Tests 680
14.1 Non-BBMD B/IP Device 680
14.2 BBMD B/IP Device with a Server Application 682
14.3 Broadcast Distribution Table Operations 686
14.4 Foreign Device Table Operations (Negative Tests) 690
14.5 BACnet Broadcast Management (No Foreign Device Table, No Applications) 691
14.6 Foreign Device Management 693
14.7 Broadcast Management (BBMD, Foreign Devices, Local Application) 697
14.8 Registering as a Foreign Device 705
14.9 Initiating BVLL Service Requests Conveying an NPDU 706
15. Reporting Test Results 708
ANNEX A – EXAMPLE EPICS (INFORMATIVE) 709
HISTORY OF REVISIONS 726

NOTE

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FOREWORD

ASHRAE Standard 135 (BACnet), a building automation and control networking protocol, is designed specifically to meet the communication needs of building automation and control systems for applications such as heating, ventilation, and air-conditioning control; lighting control; access control; elevators; and fire detection systems. The motivation behind BACnet is to provide an interoperable protocol allowing equipment from different vendors to integrate into a coherent automation and control system.

The motivation for this Standard is to provide the procedures and tools necessary to validate the interoperability of equipment claiming conformance to ASHRAE Standard 135 (BACnet). This standard defines the tools to allow a vendor to define the equipment to be tested, the language that is the grammar for the test descriptions and finally the test descriptions themselves.

As BACnet continues to improve and evolve with the changes in technology and building automation, so shall this standard.

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1. PURPOSE

To define a standard method for verifying that an implementation of the BACnet protocol provides each capability claimed in its Protocol Implementation Conformance Statement (PICS) in conformance with the BACnet standard.

2. SCOPE

This standard provides a comprehensive set of procedures for verifying the correct implementation of each capability claimed on a BACnet PICS including:

(a) support of each claimed BACnet service, either as an initiator, executor, or both,
(b) support of each claimed BACnet object-type, including both required properties and each claimed optional property,
(c) support of the BACnet network layer protocol,
(d) support of each claimed data link option, and
(e) support of all claimed special functionality.

3. DEFINITIONS

All definitions from ANSI/ASHRAE Standard 135-2016 also apply to this addendum.

3.1 local network: the network to which a BACnet device is directly connected.

3.2 remote network: a network that is accessible from a BACnet device only by passing through one or more routers.

3.3 test database: a database of BACnet functionality and objects created by reading the contents of an EPICS.

3.4 Abbreviations and Acronyms Used in the Standard

BNF Backus-Naur Form syntax
EPICS electronic protocol implementation conformance statement
IUT implementation under test
TCSL testing and conformance scripting language
TD testing device
TPI text protocol information

4. ELECTRONIC PICS FILE FORMAT

An electronic protocol implementation conformance statement (EPICS) file contains a BACnet protocol implementation conformance statement expressed in a standardized text form. EPICS files are machine and human readable representations of the implementation of BACnet objects and services within a given device. EPICS files shall use the extension ".TPI" (text protocol information) and contain normal editable text lines consisting of text character codes ending in carriage return/linefeed pairs (X'0D', X'0A').

EPICS files are used by software testing tools to conduct and interpret the results of tests defined in this standard. An EPICS file shall accompany any device tested according to the procedures of this standard.

4.1 Character Encoding

BACnet provides for a variety of possible character encodings. The character encodings in BACnet fall into three groups: octet streams, double octet streams and quad octet streams. Octet streams represent characters as single octet values. In some cases, such as Microsoft DBCS and JIS C 6226, certain octet values signal that the second octet which follows should be viewed along with the leading octet as a single value, thus extending the range to greater than 256 possible characters. In contrast, double octet streams view pairs of octets as representing single characters. The ISO 10646 UCS-2 encoding is an example. The first or leading octet of the pair is the most significant part of the value. Quad octet streams, such as ISO 10646 UCS-4, treat tuples of four octets at a time as single characters with the first or leading octet being the most significant.

To accommodate the various encodings that may be used with BACnet device descriptions, EPICS files begin with a header that serves both to identify the file as an EPICS file, and to identify the particular encoding used. The header begins with the string "PICS #" where # is replaced by a numeral representing the character set as shown in Table 4-1.