ANSI/ASHRAE Addendum d to
ANSI/ASHRAE Standard 135.1-2009

# ASHRAE ADDENDA

# Method of Test for Conformance to BACnet®

Approved by the ASHRAE Standards Committee on June 26, 2010; by the ASHRAE Board of Directors on June 30, 2010; and by the American National Standards Institute on July 1, 2010.

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**[This foreword and the "rationales" on the following pages are not part of this standard. They are merely informative and do not contain requirements necessary for conformance to the standard.]**

## FOREWORD

Addendum 135.1*d* to ANSI/ASHRAE Standard 135-2009 contains a number of changes to the current standard. These modifications are the result of change proposals made pursuant to the ASHRAE continuous maintenance procedures and of deliberations within Standing Standard Project Committee 135. The changes are summarized below.

135.1-2009*d*-1. Add test to verify that COV subscription lifetimes are not affected by time-sync requests, p.2.
135.1-2009*d*-2. Add new Active_COV_Subscription tests, p. 4.

In the following document, language added to existing clauses of ANSI/ASHRAE 135.1-2009 and addenda is indicated through the use of *italics*, while deletions are indicated by ~~strikethrough~~. Where entirely new subclauses are added, plain type is used throughout.

**135.1-2009*d*-1. Add test to verify that COV subscription lifetimes are not affected by time-sync requests.**

Rationale
A test is required to verify that a COV subscription's lifetime is not affected by changing the time in a device via TimeSynchronization-Request or UTCTimeSynchronization-Request.

**Addendum 135.1-2009*d*-1**

[Add new Clause **9.10.X**, p. 219.]

**9.10.X Ensuring Subscription Lifetimes Are Not Affected By Time Changes**

Dependencies: TimeSynchronization Service Execution Tests, 9.30; UTCTimeSynchronization Service Execution Tests, 9.31.

Purpose: To verify that the IUT correctly responds to a SubscribeCOV request to establish a subscription with a temporary lifetime and that the lifetime is not affected by TimeSynchronization or UTC-TimeSynchronization service requests.

Test Concept: The TD subscribes to an object that supports COV reporting in the IUT. The time is changed to $D_1$, which is more than 300 seconds in the future or the past. The object is made to change such that a COV notification would be generated and it is verified that a COV notification is issued. The subscription is then allowed to expire and the object is changed again such that a COV notification would be generated, if a subscription were present. It is verified that no notification is generated.

Test Configuration: The IUT contains an object that supports COV reporting. If the IUT does not support TimeSynchronization or UTC-TimeSynchronization, then this test shall be omitted.

1. TRANSMIT SubscribeCOV-Request,
   'Subscriber Process Identifier' = (any valid process identifier),
   'Monitored Object Identifier' = (any object supporting COV notifications),
   'Issue Confirmed Notifications' = TRUE | FALSE,
   'Lifetime' = (a value between 60 seconds and 300 seconds)
2. RECEIVE BACnet-SimpleACK-PDU
3. BEFORE **Notification Fail Time**
   IF (the subscription was for confirmed notifications) THEN
   RECEIVE ConfirmedCOVNotification-Request,
   'Subscriber Process Identifier' = (the same identifier used in the subscription),
   'Initiating Device Identifier' = IUT,
   'Monitored Object Identifier' = (the same object used in the subscription),
   'Time Remaining' = (the requested subscription lifetime),
   'List of Values' = (values appropriate to the object type of the monitored object)
   TRANSMIT BACnet-SimpleACK-PDU
   ELSE
   RECEIVE UnconfirmedCOVNotification-Request,
   'Subscriber Process Identifier' = (the same identifier used in the subscription),
   'Initiating Device Identifier' = IUT,
   'Monitored Object Identifier' = (the same object used in the subscription),
   'Time Remaining' = (the requested subscription lifetime),
   'List of Values' = (values appropriate to the object type of the monitored object)
4. MAKE (a change to the monitored object that should cause a COV notification)
5. BEFORE **NotificationFailTime**
   IF (the subscription was for confirmed notifications) THEN
   RECEIVE ConfirmedCOVNotification-Request,
   'Subscriber Process Identifier' = (the same identifier used in the subscription),

'Initiating Device Identifier' = IUT,
'Monitored Object Identifier' = (the same object used in the subscription),
'Time Remaining' = (a value greater than 0 and less than the requested subscription lifetime),
'List of Values' = (values appropriate to the object type of the monitored object)
TRANSMIT BACnet-SimpleACK-PDU
ELSE
RECEIVE UnconfirmedCOVNotification-Request,
'Subscriber Process Identifier' = (the same identifier used in the subscription),
'Initiating Device Identifier' = IUT,
'Monitored Object Identifier' = (the same object used in the subscription),
'Time Remaining' = (a value greater than 0 and less than the requested subscription lifetime),
'List of Values' = (values appropriate to the object type of the monitored object including the changed value of that triggered the notification)

6. TRANSMIT
DA = GLOBAL BROADCAST,
SA = TD,
BACnet-Unconfirmed-Request-PDU,
'Service Choice' = TimeSynchronization-Request,
date = $D_1$,
time = $D_1$
7. TRANSMIT
DA = GLOBAL BROADCAST,
SA = TD,
BACnet-Unconfirmed-Request-PDU,
'Service Choice' = UTC-TimeSynchronization-Request,
date = $D_1$,
time = $D_1$
8. MAKE (a change to the monitored object that should cause a COV notification)
9. BEFORE **NotificationFailTime**
IF (the subscription was for confirmed notifications) THEN
RECEIVE ConfirmedCOVNotification-Request,
'Subscriber Process Identifier' = (the same identifier used in the subscription),
'Initiating Device Identifier' = IUT,
'Monitored Object Identifier' = (the same object used in the subscription),
'Time Remaining' = (a value greater than 0 and less than the requested subscription lifetime),
'List of Values' = (values appropriate to the object type of the monitored object)
TRANSMIT BACnet-SimpleACK-PDU
ELSE
RECEIVE UnconfirmedCOVNotification-Request,
'Subscriber Process Identifier' = (the same identifier used in the subscription),
'Initiating Device Identifier' = IUT,
'Monitored Object Identifier' = (the same object used in the subscription),
'Time Remaining' = (a value greater than 0 and less than the requested subscription lifetime),
'List of Values' = (values appropriate to the object type of the monitored object including the changed value of that triggered the notification)
10. WAIT (the remaining lifetime of the subscription)
11. MAKE (a change to the monitored object that would cause a COV notification if there were an active subscription)
12. CHECK (verify that the IUT did not transmit a COV notification message)

**135.1-2009*d*-2. Add new Active_COV_Subscription tests.**

Rationale
There are currently no tests in Standard 135.1-2009 to test the functionality of the Active_COV_Subscriptions property, but tests for this functionality are needed.

**Addendum 135.1-2009*d*-2**

[Change Clause **7.3.2.10**, p. 63]

**7.3.2.10 Device Object ~~Test~~Tests**

~~All~~*Most* necessary tests for functionality of the Device object are covered by tests for the application service or special functionality to which they correspond. The following tests cover cases that are not covered elsewhere.

[Add new Clause **7.3.2.10.1**, p. 63]

**7.3.2.10.1 Active_COV_Subscriptions SubscribeCOV Test**

Purpose: This test case verifies that the IUT correctly updates the Active_COV_Subscriptions property when COV subscriptions are created, cancelled and timed-out using SubscribeCOV.

Configuration Requirements: In this test, the tester shall choose three standard objects, $O_1$, $O_2$, and $O_3$, for which the device supports SubscribeCOV. $O_1$, $O_2$, and $O_3$ are not required to refer to different objects. The tester shall also choose three non-zero unique process identifiers, $P_1$, $P_2$, and $P_3$, and three non-zero lifetimes $L_1$, $L_2$ and $L_3$. Lifetime $L_1$ shall be long enough to allow the initial part of the test to run through to step 14. Lifetimes $L_2$ and $L_3$ shall be long enough for the whole test to be completed without expiring.

The IUT shall start the test with no entries in its Active_COV_Subscriptions property.

Test Steps:

1. TRANSMIT SubscribeCOV-Request,
   'Subscriber Process Identifier' = $P_1$,
   'Monitored Object Identifier' = $O_1$,
   'Issue Confirmed Notifications' = TRUE,
   'Lifetime' = $L_1$
2. RECEIVE BACnet-SimpleACK-PDU
3. BEFORE **NotificationFailTime**
   RECEIVE ConfirmedCOVNotification-Request,
   'Subscriber Process Identifier' = $P_1$,
   'Initiating Device Identifier' = IUT,
   'Monitored Object Identifier' = $O_1$,
   'Time Remaining' = (a value approximately equal to $L_1$),
   'List of Values' = (values appropriate to the object type of the monitored object)
4. TRANSMIT BACnet-SimpleACK-PDU
5. VERIFY Active_COV_Subscriptions = {{ {TD, $P_1$}, {$O_1$, Present_Value }, TRUE, (a value less than $L_1$), (a valid Increment if the property is REAL) }}
6. TRANSMIT SubscribeCOV-Request,
   'Subscriber Process Identifier' = $P_2$,
   'Monitored Object Identifier' = $O_2$,
   'Issue Confirmed Notifications' = FALSE,
   'Lifetime' = $L_2$
7. RECEIVE BACnet-SimpleACK-PDU
8. BEFORE **NotificationFailTime**
   RECEIVE UnconfirmedCOVNotification-Request,

'Subscriber Process Identifier' = $P_2$,
'Initiating Device Identifier' = IUT,
'Monitored Object Identifier' = $O_2$,
'Time Remaining' = (a value approximately equal to $L_2$),
'List of Values' = (values appropriate to the object type of the monitored object)

9. VERIFY Active_COV_Subscriptions = {{ {TD, $P_1$}, {$O_1$, Present_Value}, TRUE, (a value less than $L_1$), (a valid Increment if the property is REAL) }, {{TD, $P_2$}, {$O_2$, Present_Value}, FALSE, (a value less than $L_2$), (a valid Increment if the property is REAL) }}
10. TRANSMIT SubscribeCOV-Request,
    'Subscriber Process Identifier' = $P_3$,
    'Monitored Object Identifier' = $O_3$,
    'Issue Confirmed Notifications' = FALSE,
    'Lifetime' = $L_3$
11. RECEIVE BACnet-SimpleACK-PDU
12. BEFORE **NotificationFailTime**
    RECEIVE UnconfirmedCOVNotification-Request,
    'Subscriber Process Identifier' = $P_3$,
    'Initiating Device Identifier' = IUT,
    'Monitored Object Identifier' = $O_3$,
    'Time Remaining' = (a value approximately equal to $L_3$),
    'List of Values' = (values appropriate to the object type of the monitored object)
13. VERIFY Active_COV_Subscriptions = {{{TD, $P_1$}, {$O_1$, Present_Value}, TRUE, (a value less than $L_1$), (a valid Increment if the property is REAL)}, {{TD, $P_2$}, {$O_2$, Present_Value}, FALSE, (a value less than $L_2$), (a valid Increment if the property is REAL)}, {{TD, $P_3$}, {$O_3$, Present_Value}, FALSE, (a value less than $L_3$), (a valid Increment if the property is REAL)}}
14. WAIT $L_1$ + the IUT's timer granularity
15. VERIFY Active_COV_Subscriptions = {{{TD, $P_2$}, {$O_2$, Present_Value}, FALSE, (a value less than $L_2$), (a valid Increment if the property is REAL)}, {{TD, $P_3$}, {$O_3$, Present_Value}, FALSE, (a value less than $L_3$), (a valid Increment if the property is REAL)}}
16. TRANSMIT SubscribeCOV-Request,
    'Subscriber Process Identifier' = $P_3$,
    'Monitored Object Identifier' = $O_3$
17. RECEIVE BACnet-SimpleACK-PDU
18. VERIFY Active_COV_Subscriptions = {{{TD, $P_2$}, {$O_2$, Present_Value}, FALSE, (a value less than $L_2$), (a valid Increment if the property is REAL) }}
19. TRANSMIT SubscribeCOV-Request,
    'Subscriber Process Identifier' = $P_2$,
    'Monitored Object Identifier' = $O_2$
20. RECEIVE BACnet-SimpleACK-PDU
21. VERIFY Active_COV_Subscriptions = { }

[Add new Clause **7.3.2.10.2**, p. 63]

**7.3.2.10.2 Active_COV_Subscriptions SubscribeCOVProperty Test**

Purpose: This test case verifies that the IUT correctly updates the Active_COV_Subscriptions property when COV subscriptions are created, cancelled and timed-out using SubscribeCOVProperty.

Configuration Requirements: In this test, the tester shall choose three objects and properties, $O_1$, $O_2$, and $O_3$, for which the device supports SubscribeCOVProperty. $O_1$, $O_2$, and $O_3$ are not required to refer to different objects. The tester shall also choose three non-zero unique process identifiers, $P_1$, $P_2$, and $P_3$, and three non-zero lifetimes, $L_1$, $L_2$ and $L_3$. Lifetime

$L_1$ shall be long enough to allow the initial part of the test to run through to step 14. Lifetimes $L_2$ and $L_3$ shall be long enough for the whole test to be completed without expiring.

Test Steps: The test steps for this test case are identical to the test steps in Clause 7.3.2.10.1 except that SubscribeCOVProperty is used instead of SubscribeCOV and the Active_COV_Subscriptions entries shall reflect the property actually subscribed to (and not Present_Value if the subscribed property is not Present_Value).

[Add a new entry to **History of Revisions**, p. 489]

**(This History of Revisions is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard.)**

**HISTORY OF REVISIONS**

| ***Summary of Changes to the Standard*** |
|---|
| **…** |
| **Addendum *d* to ANSI/ASHRAE 135.1-2009**<br>Approved by the ASHRAE Standards Committee June 26, 2010; by the ASHRAE Board of Directors June 30, 2010; and by the American National Standards Institute July 1, 2010.<br><br>1. Add test to verify that COV subscription lifetimes are not affected by time-sync requests.<br>2. Add new Active_COV_Subscription tests. |

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ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.